

APPENDIX NO. 4

ACC ARCHITECTURAL AND INTERIOR DESIGN STANDARDS

**AIR COMBAT COMMAND
CIVIL ENGINEER**

**ARCHITECTURAL AND INTERIOR
DESIGN STANDARDS**



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COMMAND STANDARDS

The Air Combat Command Architectural and Interior Design Standards provide guidance for all facilities on ACC installations, tenants on ACC bases, and ACC units on other major command (Majcom) installations except interior finishes in tenant facilities. It covers all project types including Military Construction (MILCON), Operations and Maintenance (O&M), Non-Appropriated Fund (NAF), P-341, and any base or tenant support by in-house, Self-Help, or Rapid Engineer Deployable Heavy Operational Repair Squadron Engineer (RED HORSE) resources. ACC bases must follow the ACC policy standards in local base architectural standards.

The ACC Architectural and Interior Design Standards must be followed in all these circumstances unless a waiver is obtained from ACC/CV. All waiver requests must be a signed letter by the Wing Commander of the requesting ACC base or the unit commander for units not on ACC bases. Submit the waiver request to ACC/CE, 129 Andrews Street, Suite 102, Langley AFB VA 23665. Submit the waiver request early in the design process, at least by the thirty-five percent design stage. Allow a minimum of 12 working days from the date of receipt for processing.

All AF 1391C forms submitted to ACC/CEP shall contain a section that identifies whether or not the project complies with the ACC Architectural and Interior Design Standards and the Base Architectural Standards. For more information contact ACC/CECT.

REGULATORY GUIDELINES

The ACC Architectural and Interior Design Standards are not intended to provide comprehensive technical information generally known to professional architects, planners, engineers and interior designers. This guide does not provide all the information needed to design and execute a successful project, but should be used in conjunction with other documents and project specific criteria. All ACC projects must comply with regulatory guidelines such as the local building code, the National Electric Code, the Air Force Policy Directive for Installations and Facilities (AFPD 32-10), the Air Force Joint Manual for Installation Design (AFJMAN 32-1008), the Air Force Instruction for Design and Construction Standards and Execution of Facility Construction Projects (AFI 32-1023), the Air Force Instruction for Planning and Programming of Facility Construction Projects (AFI 32-1021), the Air Force Instruction for Planning and Programming Nonappropriated Fund Facility Construction Projects (AFI 32-1022), the Air Force Instruction for Planning and Programming Appropriated Funded Maintenance, Repair, and Construction Projects (AFI 32-1032), the Air Force Instruction for Standard Facility Requirements (AFI 32-1024), Air Force Pamphlet for Sign Standards (AFPAM 32-1097), the Air Force Instruction for Air Force Comprehensive Planning (AFI 32-7062), the Interim Department of Defense Antiterrorism/Force Protection Construction Standards, the Air Force Installation Force Protection Guide, the Air Combat Command Instruction Exterior Signs (ACCI 32-1054), the Uniform Federal Accessibility Standards, the Americans with Disabilities Act, the Military Handbook 1008C, NFPA 101, NFPA 1141 and the Uniform Building Code. This list is not

meant to be all-inclusive. Architects, planners, engineers and designers should check with their Design Agent or government project manager for the latest guidelines.

ARCHITECTURAL DESIGN POLICY

The special character of defense installations dictates “compatibility” over “personal style” or “architectural statements”. The limited size and function of ACC bases cannot accept the diverse opinions of the many design professionals without becoming cluttered and unsettled. In this context, “good design” is defined as design that contributes to the overall harmony of the base rather than design that attracts individual attention. Good examples of where ACC goals should lead are college campuses and corporate office parks. Because we do not want monotony, every building does not have to be the same, but some common architectural element or theme should tie all buildings together to create architectural compatibility. Buildings that hold special importance on the base such as wing headquarters and chapels should stand out as object buildings. Other buildings should function as background buildings. All buildings should be aesthetically attractive, convenient and logically laid out, technically sound, compatible with their environment and built with long-lasting materials and details that reduce life cycle costs. Responsible design will achieve this goal.

The Architectural Policy has a set of goals that guide the development of the policy.

- Site Conditions. Provide site improvements and building forms appropriate to any new, future or existing buildings. Facilities having similar or related functions should be located in the same vicinity. Do not let parking dominate. Encourage pedestrian access. Relate building forms to each other. Create small clusters of related buildings as opposed to spreading buildings out across the landscape.

- Environmental. Design facilities in ways to enhance environmental quality and minimize consumption of natural resources. Tightly cluster buildings that are related to each other creating walkable campuses. These clusters will reduce the amount of land use, utility costs to run utilities to large expanses of land, and vehicle costs to move from building to building. Consider participation in the Leadership in Energy and Environmental Design program.

- Layouts. Provide functional layouts that are logical and satisfy users’ needs both inside and outside of the facility as well as layouts that have the ability to accommodate other future users. Anticipate and plan for expansion.

- Low Maintenance. Use permanent low-maintenance exteriors that are compatible with ACC base standards and their natural and manmade environments. Use materials that do not require painting during their lifetime. Emphasize low life-cycle costs. Use indigenous landscaping that requires little or no irrigation and little or no maintenance.

- Aesthetics. Design buildings that are aesthetically attractive using materials that are indigenous to the local area or the function of the base. Follow the Base Architectural Standards. Keep in mind that all buildings do not have to be “object” buildings. Buildings such as chapels, dining halls, public buildings, etc. should stand out as object buildings, whereas other buildings should

blend into the background emphasizing the object buildings. Facilities should foster a sense of pride among its occupants.

- Technology. Provide technically sound buildings at low costs. Take advantage of emerging technologies, but not at the expense of aesthetics or standards!

- Cost. Reduce life-cycle costs. Concentrate on low life-cycle costs as opposed to low initial costs. Our facilities should be designed, constructed and maintained to last decades. Reduce labor-intensive maintenance procedures.

- Approval. Obtain user approval of design concept layout prior to predesign conferences in order to prevent costly changes during final design, contracting and construction. This is normally done through a Customer Concept Document prior to preparation of programming documents.

SITE DESIGN

The land in-between and around our buildings provides the fabric which holds our bases together. As such, these areas need to be as well thought out as our buildings. Well-designed outdoor spaces help create friendly, inviting, walkable communities. Site selection and design are important to achieve compatibility with the Base General Plan. The following guidelines for site location, site issues, pavements, landscaping, site amenities, site signage and infrastructure will help contribute to this compatibility. Include all applicable standards including force protection/anti-terrorism.

Location:

Situate new buildings within compatible functional groups as determined by the base master plan.

- Complexes. Locate buildings supporting common functions such as civil engineering, administrative, or flying functions in complexes in order to share a common infrastructure of roads, parking, utilities and security. These tight clusters should read as one idea with similar details and materials that link them aesthetically as well as functionally. Provide enough space around a complex for expansion. Assume ten expansion whenever other supporting data is not available.

- Environmental. Design facilities in ways to enhance environmental quality and minimize consumption of natural resources. Clustered buildings reduce the amount of land use, utility costs to run utilities to large expanses of land, and vehicle costs to move from building to building.

- Traffic. When existing traffic patterns are changed by new construction proposals, provide adequate traffic alternatives to coincide with the construction of the new project. Locate buildings so that you can walk between buildings in a functional group. Only encourage driving when walking cannot be accommodated. Design parking lots so traffic can move between

adjacent parking lots. Avoid the commercial strip parking lot system where lots are designed so vehicles cannot move between lots.

- Noise. Consider noise levels and attenuation requirements when locating facilities. Do not locate facilities in incompatible noise zones unless no other options are available.

Site:

Once the site has been selected, address every aspect of site planning early in the process, including building siting, relationship of interior spaces to the site, pavement, landscaping, pedestrian access, signage, service equipment, infrastructure, and other barriers. Design facilities considering both the inside functional requirements of the buildings and the influence of the site. Design the entire site. Include all applicable standards including force protection/anti-terrorism.

- Site influence. Do not use sites that force building functions into basements, third floors, or uneconomical shapes such as curves, diagonals, or long rectangles.

- Open area. Use sites that permit open landscape space around buildings to separate the building from required pavement. Prevent an overcrowded appearance. Do not allow pavements to come directly up to facilities except for especially selected, purely industrial uses.

- Existing site contours. After positive drainage away from buildings is developed, use existing or natural grades and contours to avoid excessive cut and fill operations.

- Setbacks. Sites need to allow minimum setbacks from other structures such as buildings, roads, and parking. Minimum setbacks are 25' for the front and rear, and 30' for the side. Keep setbacks consistent with buildings and other structures in the area.

- Environmental. Site buildings in accordance with appropriate laws and directives regarding wetlands, flood plains, protected species habitats, and archeological sites.

- Screening. Screen utility equipment, dumpsters, and storage areas. Use walls and mature landscaping or berms. Do not use chain-link fence. Exterior recycling bins should be treated and screened as trash dumpsters.

Pavements:

Pavements include streets, parking lots, sidewalks, and airfield pavement.

- Parking. Use size, location, and screening to prevent parking from becoming a dominant feature. Use consistent angles and stall sizes in all parking areas. Use drop-off areas at high-use facilities to decrease close-in parking. Use raised parking islands to break up parking areas except in areas with excess snow. (Contact ACC/CEC for a list of excess snow areas). Curb all parking lots and avoid using wheel stops/bumper blocks.

- Buildings and Parking Lots. Do not locate parking directly in front of buildings or entrances. Do not locate parking between the main viewing street and buildings. Locate parking behind

buildings. When a building is located between a street and a parking lot the building appearance is improved and the parking is screened with minimum cost. Consider building shape and relationship to other buildings to provide as much screening as possible. Ensure the principle or main view of the building presents a pleasing and uncluttered appearance. The parking arrangement is a major factor in providing an orderly appearance.

- Parking Lot Size. Use separate smaller parking lots of 50 cars or less rather than one large lot. Where large parking lots exist, landscape approximately ten percent of the area within the lot except in excess snow areas. (Contact ACC/CEC for a list of excess snow areas)..

- Walking distance. Design parking lots to limit walking distance. Use a maximum of 200 feet for most buildings; for transient and unaccompanied housing limit luggage carrying and walking distance to 100 feet.

- Paving. Use economical asphalt paving for most vehicle parking areas, but avoid asphalt sidewalks and curbs. As a minimum, use concrete for sidewalks and curbs. Consider special unit pavers for courtyards, plazas, entrances and other high-profile sites. Provide a landscape buffer between all buildings and paved areas.

- Streets. Avoid utility or other cuts in pavement. Whenever possible use tunneling technologies to go under pavement with conduits or piping. Streets should intersect at right angles and offset intersections should be avoided.

- Curbing. Curb all parking, access roads and streets (except remote/isolated). All primary streets and all parking lots should be paved with integral concrete curbs and gutters. Painted curbs are prohibited because they are very difficult to maintain. Provide mower ramps for access to grass areas.

- Walkways. Use concrete walkways at least 48 inches wide to link facilities and promote pedestrian use. Illuminate walkways used heavily at night. Provide walkways on at least one side of every street and between all facilities. Avoid placing utility poles or signs too close to sidewalks. Locate walkways judiciously and in accordance with the Manual on Uniform Traffic Control Devices. Contact ACC/CEO for further guidance.

- Handicapped Access. Ensure handicapped access is provided at intersections, crosswalks and wherever UFAS and ADA require them to be.

- Drainage. Design paved areas to minimize drainage. Drain into natural water courses, detention, and retention ponds.

Landscape:

The use of appropriate trees and other landscape plantings provides a positive first impression, promotes energy efficiency, inhibits erosion, reduces noises, and enhances safety by helping to control blowing/drifted snow. Landscape planting also supports national policy aimed at enhancing air quality. All landscape plantings should comply with the base land management

plan. Develop functional rather than purely visual landscapes. Plan to reduce maintenance. Provide a landscaped space uncluttered by vehicles in front, at the entrance, and between the main viewing street and buildings.

- *Plant material.* Consult the Base Architectural Standards for an appropriate landscaping material list. Use indigenous, low maintenance, adapted trees and shrubs locally recommended for urban or street use that can survive without irrigation after the first season (one year) warranty maintenance period. Do not use plant material that drops large amounts of fruit or seedpods. Select deciduous trees that drop all their leaves early in the fall season rather than those that retain brown leaves most of the winter and continue to be a maintenance problem for many months. Some trees to avoid are Sycamore, Beech, and some Oaks. Place mulch bed around all trees and shrubs. Consider fabric barriers that contain an effective pre-emergent herbicide that will provide protection for many years.

- *Sustainable Landscaping.* Landscaping practices should incorporate sound design planning while minimizing the requirement for fertilizers and pesticides. Use water efficient practices such as mulches, efficient irrigation systems (drip irrigation), and reclaimed water. Consider using boulders with plants, gravel blankets for grass, and pebbles for ground cover. Soften arid landscaping with varied contours and drought-tolerant plantings.

- *Preservation.* Preserve existing landscape where possible. Use consolidated development areas to help preserve the existing landscape. Avoid overplanting and allow for natural growth and form of plants. Limit turf and keep it free of obstructions which require trimming. Define planting areas with walkways, edging and concrete curbs.

- *Mowing strips.* Provide planting beds with wide mowing strips. Mowing strips should eliminate hand trimming and edging caused by turf creeping into bedding plants.

- *Surface Runoff.* Use trees, shrubs, grass and landscaping to reduce storm water runoff. Terrace steep slopes.

- *Berms.* Use berms to screen and restrict views. Limit berm slope to one foot in 10 feet. Do not use earth berms against building walls.

- *Function.* Use landscape to reduce energy cost, shade to prevent heat and glare, and windbreaks to lessen air infiltration. Use landscape to screen unsightly views, control pedestrian circulation, define entries, and accenuate outdoor amenities.

Site Components:

Site components include site furniture, bicycle racks, trash receptacles, etc. Site components and the spaces in between buildings should be as carefully planned as the spaces within buildings. These spaces provide a cost effective way to provide pleasurable spaces. Encourage attention to detail concerning each of these site components. Work to reduce visual clutter, unnecessary signs, receptacles, etc. Include all applicable standards including force protection/anti-terrorism.

- Site Furniture. Site furniture is defined as furniture or other accessories provided in outdoor areas for the comfort or convenience of personnel. Examples are benches, litter receptacles, ash cans, picnic tables, and bicycle racks. The design of site furnishings should respond to the local climate and cultural influences. Bases have established an overall plan that complements the installation architecture and environment. Use these for site furniture selection.

-- Color. Use site furnishings to complement exterior color schemes. Limit colorful accents to high-profile sites. Ban the use of red ash cans and yellow pipe bollards.

-- Materials. Use durable materials which are appropriate for the architectural context and the environment, such as factory finished metals, precast concrete, or quality wood. In hot climates, be careful of metal finishes that may burn anyone who might touch the object.

-- Outdoor Seating. Provide comfortable benches or seat walls near building entrances and in courtyards. Tables should be limited to informal gathering places such as picnic or dining areas.

-- Receptacles. Place litter receptacles and planters on paved sites where they are clear of circulation. All litter receptacles require attached lids. Ash receptacles must match outdoor furniture.

-- Bollards. Bollards shall be set into paving or placed in sleeves to allow access. Use bollards to enhance pedestrian protection and provide vehicle control.

-- Bicycle Racks. Bicycle racks should be located near entrances in secure, visible areas. Racks must be on concrete, brick or block pads. Use simple, attractive racks.

-- Flag Poles. Locate flag poles in accordance with AFR 900-3. Morale flagpoles are not allowed in accordance with AFI 84-105.

-- Other Assorted Items. Consider accessories such as newspaper vending machines, smoking receptacles, planters, refuse containers, and other equipment in design plans. Neutralize the visual impact of these items by developing a basewide standard, as well as painting, concealment, or removal. Locate these items in convenient yet discrete locations.

Site Signage:

Site signage must provide clear, consistent, and necessary direction or information. Correctly designed and controlled signs can be a positive aspect of the installation's overall professional image. Follow ACCI 32-1054, Sign Standards Pamphlet. The following are excerpts from ACCI 32-1054 and are not all inclusive. National Highway Traffic Safety Administration signs must be used for all regulatory and warning traffic signs.

- Visual Clutter. Reduce visual clutter by eliminating super-graphics, poorly designed signs and outdated information. Taping temporary signs on doors, walls, or windows is prohibited.

Condense and consolidate information to minimize the number of signs. Standardize the height of all signs by type. Use sign systems that will accommodate changes.

- *Color*. All exterior signs will be consistent throughout each installation. Langley brown (Federal spec 21000) background is the ACC standard. Poles and back of signs should be painted or factory finished to match.

- *Street Signs*. Include the Command shield on all street signs. Color and lettering should be consistent with other signs on the installation. Ensure there is a street name sign for each street at intersections.

- *Directional Signs*. Install directional signs only where needed to guide visitors and new base personnel. Normally, only four entries should be displayed on a sign.

- *Special Signs*. Limit unique signing to high-visibility locations where highlights are required to support the architectural theme. Avoid plastic letters and marquee and warning signs on the outside of utility or equipment room doors unless required by code.

- *Parking Signs*. Reduce the number of parking signs by strictly limiting reserved parking, including temporary reserved parking. Standardize reserved parking designations by installation.

- *Temporary Sign Standards*. Develop a simple base standard for temporary signs such as a painted brown 4"x4" column with a wood base and a brown sign with white lettering .

Infrastructure:

Components of the installation infrastructure such as street and area lighting and fuel and water storage tanks must be considered when developing facilities. Emphasis should be placed on reducing visual impact by proper siting, painting, screening, or concealment. Utilities should be underground whenever possible. Allow sufficient capacity for future growth. Ensure all applicable standards are followed including force protection/anti terrorism.

- *Color*. New equipment should have a factory-applied color appropriate to the installation standards. Paint existing equipment to match. Avoid galvanized or green finishes.

- *Screening*. Use walls and landscaping to screen all utility equipment but maintain required access and clear zones. Avoid the use of metal or wood fencing. Do not use chain-link fencing except for perimeter fencing or high security locations. See the Base Architectural Standards for screening materials appropriate at each base.

- *Special Purpose Lights*. Use lighted bollards along high-use walkways, inset stair and wall lights for plazas and high-use walkways.

- *Street and Parking Lights*. Rectangular shaped luminaries are preferred for high-profile locations and dark colored cobra heads for outlying sites. Comply with the Base Architectural Standards. Use consistent lamp types. Metal halides lamps are preferred for most areas, but

sodium lamps may be used where necessary. Avoid bright finishes and trendy mountings. Avoid use of low-pressure sodium lamps.

- *Fuel and Water Storage Tanks.* ACC prefers well-screened, appropriately site above ground tanks. Ideally this means that each tank is located out of view from any major road, main building entrance or significant outdoor space and well screened with a screen wall that matches its parent facility or if there is no parent facility follow the Base Architectural Standards. If this is not possible then use a vaulted tank and size the manholes adequately for maintenance and inspection or use a UST compliant with ACC MAN 32-7051. All UST locations and screening must be approved by ACC/CEC. Submit supporting documents (plans, site plan, elevations, tank details) to ACC/CECT. On above ground storage tanks avoid multiple colors, super-graphics, logos, and glossy finishes. Colors should be consistent with the installation Base Architectural Standards. Elevated storage tanks may be used to display the AF shield only on the base standard tan or beige background, appropriately sized and proportioned. Send in a site plan for each tank for ACC/CEC approval during the planning phase of the project.

- *Security.* Use quartz lights in secure areas and controlled access points where an instant-on feature is required. Do not use lighting to enhance architectural features.

- *Fire Protection.* All facilities must be designed and constructed in accordance with Mil Handbook 1008B and other ETLs available through ACC/CEC.

- *Sewer.* When siting multiple facilities, gravity flow sewers are desired instead of individual pumping stations at each facility.

- *Efficient Use of Utilities.* New facilities must be designed and constructed to minimize life cycle costs or exceed energy performance standards. Active and passive solar will be considered in new designs. Water conservation initiatives are encouraged. Many varieties of fluorescent and high-intensity discharge lighting produce quality lighting.

FACILITY DESIGN

Our buildings and the areas around them provide not only our places of work and relaxation but also reflect our sense of pride in ourselves. As such, each building and its site should be aesthetically attractive, convenient for its users, technically sound, compatible with its environment, and built with long-lasting materials and details. Refer to the installation Base Architectural Standards for exterior base standards. Base standards establish an architectural theme in keeping with the existing historical styles, local climate, and construction standards. Provide economical construction without compromising a high quality, architecturally pleasing, and professional military appearance. Ensure all standards are followed including force protection/anti-terrorism.

Exterior treatment requires careful management to achieve the desired overall compatibility. Each base has to define a context and direction based on existing built and natural environment.

Ensure that the exterior details respond to the building's use, location and importance on base. Use of the following guidelines will achieve the desired ACC standard.

Form:

Use simple plans and building forms as well as conventional sloping roofs. Eave heights may vary as required by interior functional relationships, but do not use more than one pitch angle on a building. Do not combine two kinds of roof such as flat and sloping roofs on the same building unless it is clearly justified by the influence of adjacent architecture, building function or layout. Minimize corners, offsets and curves on horizontal and vertical surfaces. Use only as clearly justified by the adjacent architecture, building function, or layout.

- *New versus old.* Imitate and improve on existing base building forms to provide harmony between new and old. When new sloping roofed buildings are sited among existing flat profiled buildings, steps must be taken to develop some secondary flat forms to relate the new to the old.

- *Height.* Except for dormitories, which are limited to three stories, limit buildings to two stories above ground. Do not use basements for occupied spaces.

- *Main Entrance.* Main entrances should face a major street. Emphasize the main entrance of all facilities using a combination of architectural treatments and building signage.

- *Mechanical.* Do not let mechanical systems become form-givers. Locate mechanical units to the rear or side of buildings. Design these features to blend in and to integrate with the building architecture in such a way that they are not prominent or detectable. Match materials for mechanical enclosures to the building they serve; i.e., masonry with masonry. Do not use roof-mounted equipment. If no other alternative is available waiver requests for rooftop mechanical equipment should be submitted to ACC/CEC. If required, match the equipment enclosure to the roof or wall material, as much as possible. Equipment wells are also acceptable. As a minimum, screen any equipment at ground level with landscape. In arid climates architectural screens are required. When screening mechanical equipment, ensure adequate clearance, as recommended by the equipment manufacturer, is provided to allow for proper air circulation and maintenance.

Walls:

Minimize use of curves, cants or angles other than 90-degree corners. Use only as clearly justified by the adjacent architecture, building function or layout.

- *Material.* On exterior walls use low maintenance durable materials that are integrally colored and textured such as brick, split-face Concrete Masonry Units (CMU), split ribbed CMU, prominently exposed aggregate on precast concrete or other substrates, and integrally colored concrete that is textured by use of form liners. Brushed, honed or sandblasted concrete is not acceptable. Do not use materials that require painting on new buildings. Avoid the use of materials that require painting on renovation projects. Use of bricks, blocks, or grout containing fly ash or other byproducts is encouraged. Use concrete containing fly ash or other recycled materials. Autoclaved cellular cement should be used where appropriate. On interior walls the use of exposed or painted CMU is not allowed except in gymnasiums or industrial uses.

Decorative split-face CMU, ribbed CMU, or similarly integrally colored, textured masonry materials may be used as interior finishes in building entries with a waiver from ACC/CEC.

- *Metal*. Metal walls are only acceptable for extremely large buildings such as aircraft hangars and temporary buildings. See the metal building section of this document. Exposed metal stairs are not acceptable in any renovation or new facility.

- *Painting*. Do not paint new buildings and do not use materials that are typically restored by painting such as stucco, exterior insulation finish systems, metal fascia, and various kinds of siding on renovations. Secondary doors may be painted as described in the next paragraph. On metal buildings, select a factory prefinished material. See the Base Architectural Standards for this selection.

- *Anodized Aluminum*. Color anodized aluminum in neutral colors (suggest dark to light bronze) is recommended for exterior metals normally associated with walls such as fascia, gutters, downspouts, windows, and building entrances. Fire exit doors and other secondary doors and frames may be painted for economy. When painting secondary doors and fire exits, they should be painted to match the primary color anodized entrances or painted to match adjacent walls; this is a designer option. The objective is to produce a simple appearance which is uncluttered by many colored shapes.

Doors and Windows:

Aluminum anodized, factory finished door and window frames are preferred for most locations. Avoid use of mirrored glazing. Operable windows and tinted, energy-efficient glazing are encouraged. Where appropriate, install window screens to take advantage of natural ventilation. Provide window screens where windows are operable and designed for ventilation. Windows, which operate primarily to allow cleaning, do not need screens. Provide screens for Military Family Housing (MFH) and Unaccompanied Enlisted Personnel Housing (UEPH).

Roofs:

Flat roofs and interior gutters are prohibited. Use sloped roofs equal to or greater than 3:12. Use proven, cost-effective roof systems with high durability and weather resistance such as factory-finished standing-seam metal or shingle roof. Ensure colors are compatible with ACC and base standards. These low-maintenance alternatives are required because of the poor maintenance history of low slope (less than 3:12) single and multi-ply roofs and systems as well as built-up roofs. Generally use a hip or gabled roof. Do not combine roofing materials such as metal and shingles on one roof. Make all of the building parts compatible with each other. Overhangs for weather protection and shade are desirable. Do not locate mechanical equipment on the roof. Where unavoidable, make sure rooftop units are screened. Roof-top mechanical units require a waiver from ACC/CEC. Roofing made from recycled materials is encouraged.

- *Alternatives*. Do not use low slope roofing if 3:12 or steeper pitch is feasible. Building form and size (extremely large buildings such as supply facilities, main base exchanges, or commissaries) may occasionally require lower slopes and other materials. Roof designs lower than 3:12 require a waiver from ACC/CEC except commissaries and main base exchanges. If

designing a low slope roof, slopes as low as 1:12 are generally accepted for structural standing seam metal (consult with manufacturers for particulars). When a single or multi-ply roof is used, slope the roof at 1/4:12 minimum. The slope is to be accomplished with structural members for new built up roofs, not by tapering the insulation.

- Drainage. Provide continuous roof slope to the perimeter of the building. Do not design interior valleys or depressions that will form ponds if a roof drain becomes obstructed. Ensure overflow scuppers are provided in accordance with applicable codes for parapets. If interior drainage can not be avoided, submit to ACC/CEC for approval.

- Skylights and clerestories. These features may be used where strong functional and economic justification dictates. Fully document economic justification and submit with proposed design to include life-cycle cost of special ballast and control devices to ACC/CEC for approval. Be sure to consider heat load and occupant comfort as part of the proposed design. General area lighting for warehouses is not considered strong enough functional justification to compensate for the generally high maintenance associated with large numbers of skylights on a low slope roof.

- Metal fascia. Do not use wide metal fascias with low slope roofed buildings. If a band is desired around the top of a building, provide it with masonry detailing such as projections, soldier course, or stack bond. Masonry detailing provides a more durable maintenance free fascia that does not require painting.

Additions:

When building additions are proposed, careful coordination is required to determine if the addition should match the old building or if the old building should be changed and brought up to ACC standards at the same time as the addition.

- Small addition. When additions are less than 25% of the existing building's floor area, design additions to match the original construction.

- Large additions. When additions exceed 25% of the original building area, the addition and the original construction are required to comply with ACC standards. For example, a flat-roofed building of 10,000 square feet needs an addition of 3,000 square feet. In this example 3,000 is more than 25%. The additions would have a sloped roof, and the original building would be designed to have a sloped roof. If the original building were plain CMU, then a new exterior wall finish of textured CMU would be considered either in the form of a complete veneer or as a minimum, use textured CMU at important visual points such as entrances, planters, sign, corner protection, etc.

- Compatibility. In either case (large or small), when additions are complete, they should be architecturally compatible rather than obvious add-ons.

- Fire Sprinklers. Designers of additions need to evaluate the need for sprinkler protection for both the new and existing structure.

Metal Buildings:

Metal buildings may be used for only large structures such as hangars or temporary facilities. When large buildings are metal a masonry base proportionate to the height of the building is required. The base must be an integrally colored, textured masonry base for durability. Temporary buildings must be removed within one year. All temporary buildings and large buildings except hangars require a waiver from ACC/CEC. Specialized facilities such as water towers and fuel tanks may be metal.

- *Location*. Use metal buildings where they are compatible with adjacent structures. Do not use temporary metal buildings in highly visible locations. Temporary metal buildings used anywhere should be well screened with walls or vegetation.

- *Finish*. Use factory applied finishes with more than 15-year warranties.

- *Submit site justification*. At the programming stage, submit siting criteria and waiver request to ACC/CEC. Indicate adjacent building construction. If the building is isolated, describe how visible it is from major, minor, or service roads. State reason for selection of metal over masonry in addition to cost consideration.

- *Protective masonry*. Provide protection on the exterior of buildings where impact to metal panels is probable. For example, integrally colored and textured masonry should be used at entrances, at corners, exterior wainscot to four feet high where vehicles are parked next to buildings, around forklift operations, and at loading docks.

Colors:

Each installation is required to have an exterior color standard. The Command standard is to use neutral colors such as bronze, tan or beige or colors that occur naturally in traditional building materials as the field colors with complementary trim colors which are compatible with regional color motifs. Use neutral anodized colors such as brown tone or gray tone neutral. Judgement has to be exercised in selection of colors for isolated miscellaneous features such as exit doors, downspouts, etc. In some cases, a building benefits from having isolated features colored to match adjacent light-colored walls. This is very important on older buildings with many windows and doors. Coloring trim a contrasting color can produce a cluttered appearance.

- *Wall materials*. Select neutral colors such as beiges and browns, as large wall surfaces should not attract attention.

- *Exterior metals*. Use neutral anodized colors such as bronze. When aluminum, hollow metal, and wood are mixed on one building, hollow metal and wood may be painted to match the aluminum color or adjacent walls. In any case, do not use a third color that does not match the bronze metals. Use one trim color to the greatest extent possible.

- *New work*. Do not paint new masonry; instead use integrally colored, textured masonry materials.

- Color use. Usually two colors on a building produce the best appearance - one wall color and one trim color. Do not use more than three colors - one wall color and two trim or accent colors such as exposed aggregate fascia, columns, beams, etc.

Utility and Dumpster Enclosures:

Provide an enclosed yard to conceal miscellaneous support items such as generators, transformers, trash, lawn equipment, flammable storage, HVAC, meters, and aboveground tanks.

- Enclosures. Match enclosing walls to the building wall material. Split faced CMU is a good durable material. When this is not possible, metal slats and planting may be used. In some cases, plant material by itself may be used to conceal the service area, but it must functionally conceal the service area at the time of planting. All enclosures need to be at least six feet tall. If the items being concealed are taller than six feet then the enclosure should be as tall as the tallest item in the enclosures plus six inches. The use of open panel block is permitted when enclosing electrical substations, transformers, or switches for proper heat dissipation.

- Gates. If possible locate trash and mechanical enclosures so the access to the enclosure is not visible from major streets or major building entries. If this is not possible, provide gates for trash enclosures. Also provide gates for enclosures where accessibility needs to be limited.

- Subdivide. Organize and layout the service yards by responsibility. For instance, HVAC equipment should not be in the trash enclosure. Many of the functions may require separation and separate access such as tools, lawn mowers, fuel, etc.

- Pavement. Provide vehicular access and surfacing such as pavement, grass pavers, or gravel to reduce maintenance. Use concrete curbs or edging.

- Service Areas. Integrate service areas with the building design and match adjacent materials.

K-SPAN:

K-SPAN use and application are more suited to forward operating locations of CENTCOM and SOUTHCOM, or during contingency operations. In all cases, K-SPAN facilities to be located on ACC bases require HQ ACC/CE siting approval prior to purchase, delivery, or start of work. Treat inflatable buildings the same.

- Use. Limit K-SPAN to storage applications outside the main area of ACC bases such as weapon storage areas, if approved by ACC/CV.

- Structural. Provide additional reinforcing and structural analysis when either design wind load or design live load exceeds allowable values for a K-SPAN structure of given width and height. Consider K-SPAN structures with a factory finished metal.

- Site Justification. Submit site justification with programming documents. Provide enough information about the intended site to satisfy HQ ACC/CE that the K-SPAN buildings will be

compatible with their surroundings. Indicate what is in the site vicinity and if the buildings are visible from roads or populated areas.

Solar Application:

Integrate solar components with roof or wall forms. Give preference to passive solar applications over active solar applications. Do not let solar components clutter or break the normal building form line. Example: vertical collectors should look like glass walls and roof collectors should match the roof slope. Exceptions: when collectors do not look like walls or match roof slopes, screen them from view with materials that coordinate with the building material.

Facility Signs:

Provide signs that comply with base architectural compatibility and ACCI 32-1054, Exterior Signs. No organizational emblems, logos, or direct-paint applications are permitted. Identification of key personnel such as commanders is also not permitted. Standardize building address sign size and placement on each installation. One unit identification sign is permitted for each facility.

- Moving Signs. Do not use moving or revolving signs on ACC bases.

- Monument. Use of monument signs is limited to headquarters buildings (MAJCOM, NAF, wing and group commanders). See ACCI 32-1054 for guidance.

- Lettering Size. For signs other than those covered by ACCI 32-1054, size lettering according to the functional viewing distance. Keep sign size to a minimum. The rule to follow for readability is one inch of letter height for each 25 feet of view distance. Example: If a sign is intended to be read from a passing car using a road 100 feet away, the largest sign lettering would be four inches (100 divided by 25 equal 4). Do not oversize.

- AAFES/DeCA/Commercial Signs. Logo and lettering supplied by AAFES/DeCA/or the parent organization are required to be the AF and ACC standard. Contact ACC/CECT for a copy of the standard sign.

- Lighted Signs. Internally lighted signs create a commercial impression that is not compatible with AF and ACC standards. When night visibility is functionally required, use external flood or spot lights that illuminate both the sign and adjacent landscape or building. Illumination of the sign with its surroundings makes a better impression and improves orientation.

- Lettering. All lettering on all base signs should be of the same style, upper and lower case Helvetica medium type style.

Exterior Graphics, Striping and Banding:

- Super Graphics. Painted stripes, letters, and supergraphics are prohibited and not compatible with current AF and ACC standards.

Force Protection/Anti-Terrorism:

Coordinate and integrate force protection/anti-terrorism elements such as walls, blast protection and fences with base and building architecture as well as good architectural practices. For instance, during site planning cluster buildings that are functionally compatible with strong boundaries and move parking away from the cluster. Use distance in a positive way. During facility site design, use landscaping, bollards, planters, and other site amenities as barriers. Provide adequate lighting. Place utilities underground. In facility design, elevate the first floor, construct blast protection by surfacing it with the same materials as the building that it is protecting, and minimize signage. Good force protection/anti-terrorism planning and design is compatible with good planning and architectural practices.

INTERIOR DESIGN POLICY

Design standards have been developed by the professional design staff at Air Combat Command Civil Engineering (ACC/CECT) to provide for the best possible coordination of interior finishes and furnishings for long-lasting maintainable interiors.

These standards are developed around an understanding of the elements and principles of design and how the industry operates, not around personal likes and dislikes.

Each year the Color Association of the United States (CAUS) develops a color palette for the succeeding year. This palette changes gradually each year and is the guide by which manufacturers determine the colorways in which they will produce their products. Whether it be fashion or automobiles, refrigerators or ceramic tile, these color palettes influence manufacturers. The images of the pink and black tile bathrooms of the 50's, the avocado green or harvest gold kitchen appliances and laminate countertops of the late 60's and early 70's, and the mauve and teal color schemes of the 80's is why it is a mistake to use faddish colors in permanent finishes. All in-vogue or trendy colors become dated once wallcovering, carpet or other manufacturers change their color palette.

The Air Combat Command standards ensure materials purchased and installed in our facilities will perform well in respect to both aesthetics and durability.

Command Standards:

Air Combat Command standards vary based on whether a finish is permanent or non-permanent. The differentiation is necessary due to annual CAUS color palette changes. Generally permanent finishes last longer and consequently need to be a color that will not become dated after a few years. Non-permanent finishes do not last as long and can be updated as palettes change.

Permanent Finishes:

Permanent finishes are generally the hard surface structural interior design (SID) finishes that will last 15 to 20 years and whose removal and re-installation can be costly and may cause a major disruption to the facility. Such items as vinyl composition tile (VCT), ceramic, and other hard surface tiles, plastic laminates, toilet partitions, lockers, window blinds, all modular or systems furniture panels, work surfaces, flipper doors, etc., are considered permanent finishes.

Command standards require that all permanent finishes be in either brown-tone or grey-tone neutrals. These neutral shades can be from very light (such as off-white) to a mid-range neutral of the same shade (taupe). Neutrals with obvious pink, yellow or blue undertones should be avoided.

Non-permanent Finishes:

Carpet, paint, vinyl wallcovering, upholstery, artwork, etc. are considered non-permanent finishes. Non-permanent finishes will last from five to seven years under most conditions.

Command standards allow non-permanent finishes to be any coloration appropriate to the facility. Most often these finishes will be in mid-range colorations. Very seldom would there be a use for pastel or very bright colors in ACC facilities.

While non-permanent finishes are permitted in various colors, it is highly recommended that in office and other work areas, vinyl wallcovering or painted wall surfaces be kept in a neutral coloration. Light reflective surfaces are important to a productive work environment. Develop a neutral shell for the interior space of work areas, allowing the carpet, upholstery, artwork and accessories to provide the color accents. Since many facilities frequently change occupants or even function, this neutral shell provides a solid base for future flexibility.

Finishes and Treatments:

- Carpet. (See ETL 00-06): Air Force Carpet Standard and the ACC Carpet Guidance. In most facilities a bold tweed or patterned nylon commercial grade loop pile carpet is appropriate. Bold tweed means yarns of several different colors, not various shades of the same color. This allows for several upholstery color combinations within a facility. The majority of yarns must be in mid-range to dark tones to increase the carpet's soil hiding capabilities. In most cases, a dense loop pile is the most hardwearing type of carpet. The face weight should be a minimum of 26 oz/sy. Equally important is the density of a carpet product. Density is a key factor in soiling and resiliency. In an adequately dense pile, dirt will remain on the surface so that it is easily vacuumed away. In addition, more compact fibers are less likely to crush since tufts tend to support each other in the upright position. ACC recommends a minimum density factor of 5,000 for commercial carpets. Refer to ETL 00-06, Table 1 to calculate minimum pile weight to density ratios. Solution-dyed carpets are recommended for medical facilities, Child Development Centers, lodging facilities and Youth Centers. Olefin and polyester (PET) carpet fibers do not meet heavy or severe wear classifications required for the majority of ACC facilities. Polyester carpet is currently manufactured only in cut pile products and its crush resistance is poor. Olefin and polyester carpeting has limited use in light or moderate wear applications possibly including military family housing.

-- Carpet Tile/6' Vinyl Backed. Use of carpet tile is strongly recommended in office areas with systems or modular furniture. Installation techniques are available which allow carpet tile removal and installation without disassembling systems furniture arrangement. Carpet tile or its associated six-foot wide rolled goods should also be used in corridors. Tile or six-foot vinyl-backed products must be installed with manufacturer's recommended releasable adhesive. Extra

tiles or yardage from the same dye lot may be ordered to replace tiles or patch as necessary. Bold tweed patterns or textures help to hide seaming.

-- *Solid Carpet/Border.* Use of solid-colored carpet is approved only for Distinguished Visitors quarters in lodging facilities. Carpet borders may be solid in color. They may be installed with either carpet tile or roll goods. Do not over-do borders within a facility.

- *Hard Surface Flooring.* Hard surface or resilient flooring should be used mainly in heavy abuse areas, wet rooms or walk-off areas to provide superior wearability and cleanability.

-- *Ceramic Tile, Porcelain Tile, Natural Stone and Cast Stone Flooring.* A mottled, flecked or speckled floor tile should be used. Use a medium to dark toned grout which coordinates with the floor tile to hide staining or soiling. Recommend using epoxy grout or grout sealers to maintain appearance. Tile banding accents or patterns are allowed on walls and floors, provided the accent is another neutral shade that coordinates with the dominate tile color. Install with a coordinating base of the same material. Follow manufacturers recommended maintenance instructions. Do not apply wax or other coatings to tile or stone flooring.

-- *VCT, Sheet Vinyl, Laminate Flooring, Stratica[®], etc.* A mottled, flecked, speckled, wood or stone pattern should be used. Avoid very light tones. Install with a coordinating vinyl or rubber base. Laminate flooring is not recommended for commercial applications.

- *Vinyl or Rubber Base and Carpet Base.* Vinyl or rubber base color should coordinate with the floor or wall surface. Do not use an accent color for the base. A no-toe profile base should be used with carpet tile installations. A four inch carpet base surged with a coordinating thread or capped with a coordinating neutral vinyl or rubber carpet cap can be used in carpeted areas. If carpet base is to be used in place of a vinyl or rubber cove base, it should be the same product that meets the wall whether field or border carpet.

- *Vinyl Wallcovering.* Type II wallcovering is recommended in most applications for its superior durability and inherent ability to hide wall imperfections. Type I has very limited use in most ACC facilities. A vertical texture or pattern will help hide seaming and a heavy overall texture will hide nail holes or other damage that may occur during the life of the product. Napped material or wall carpet cannot be used as an interior finish.

- *Paint.* Use a low-sheen, latex enamel for all painted surfaces. Flat paint is difficult to maintain. Use a semigloss finish for trim paint.

- *Wainscot and Chair Rail.* Wainscot is not recommended in most areas. Dark paneled wainscot has the effect of visually reducing the size of small office spaces, while in hallways it has a railroading effect. A Type II heavy duty vinyl wallcovering installed floor to ceiling will have a better effect. The purpose of chair rail is to protect wall surfaces from being marred by chair backs. Therefore, the chair back height must be considered to properly locate the chair rail. It may be stained or painted to coordinate with the other woodwork or doors. Wainscot and chair rail should be no more than 36" high in rooms and no more than 42" high in corridors. Heavy

vinyl bumper guards may also be used to protect walls in corridors where needed. These should be in neutral tones to coordinate with the walls.

- *Laminates and Solid Surfacing*. Laminate surfaces are more easily maintained if they have a flecked, speckled, mottled, textured or stone look in a matte finish. Soiling and water spotting is nearly invisible on this type of surface. Solid surfacing material (Corian®, Avonite®, etc.) has an extended life cycle and is easily repaired, but is a costly alternative to plastic laminate and should be considered with caution.

- *Doors and Door Frames*. Depending on the quality of the doors, they may be either stained or painted. If painted, select a color to blend or coordinate with the walls. Paint should be a semigloss finish. It is not recommended to paint doors and jambs in accent colors as this fragments the space. Use artwork, upholsteries, etc. for color.

- *Window Blinds*. Vertical blinds or metal horizontal blinds should be in off-white or light neutrals. Dark blinds that match the anodized finish of the window frames are acceptable, provided the windows are of reflective glass to prevent heat build-up.

- *Ceilings*. In almost all facilities, ceilings (whether painted or ceiling tile), are to be white or off-white. Textured ceiling tiles in two-foot squares with a tegular edge are recommended.

- *Systems/Prewired Workstations/Modular Furniture*. All panel fabrics, work surfaces, flipper doors, etc., are to be in either brown-tone or gray-tone neutrals. Removable tack boards can be purchased in a colored or patterned accent fabric. Only one type of systems furniture should be used per building in order to allow greater flexibility in reconfiguration as occupants' needs change and to provide continuity throughout the space. In open office areas with systems furniture, carpet tile is recommended. Installation techniques are available which allow carpet tile removal and installation without disassembling systems furniture arrangement.

- *Interior Signage*. Interior Signage should coordinate with the facility color scheme. Neutral colors or brushed metals are preferred in most buildings. Select a style with user-friendly changeable inserts to increase flexibility and life span. Text should be a contrasting color from the background. Type style and size should be easily legible. Ensure that all new signage is ADA compliant.

MAINTENANCE AND INSTALLATION

Always install products according to manufacturer's specifications. Use qualified and reputable installers. Warranties will not be valid unless these are done.

Any finish or furnishing product is only as good as the maintenance it receives. A regular maintenance program is crucial to the longevity of any material used in a facility. In most cases, cleaning and maintenance must conform to manufacturer's instructions to validate warranties.

AFFIRMATIVE PROCUREMENT POLICY

The ACC Affirmative Procurement Policy encourages the purchase/use of items containing recycled materials if the price and availability are reasonable, the item meets reasonable performance specifications, and it would not result in inadequate competition. Use of insulation and cement/concrete containing fly ash is required.

Questions concerning any aspect of architectural or interior design may be directed to Air Combat Command Civil Engineer at ACC/CECT, Commercial (757) 764-3108, DSN 574-3108 FAX (757) 764-5339.

APPENDIX NO. 5

**AFI 32-6002 FAMILY HOUSING PLANNING,
PROGRAMMING, DESIGN AND CONSTRUCTION**

**BY ORDER OF THE
SECRETARY OF THE AIR FORCE**

AIR FORCE INSTRUCTION 32-6002

27 MAY 1997



Civil Engineer

**FAMILY HOUSING PLANNING,
PROGRAMMING, DESIGN, AND
CONSTRUCTION**

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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SUMMARY OF REVISIONS

This revision incorporates interim change (IC) 97-1 which provides guidance for limits on military family housing non-general officer quarter units with Congressional approval to exceed \$15,000. This modifies AFI 32-6002 to clarify the limit interpretation as approved by SAF/MII. A | indicates revisions from the previous edition.

Chapter 1

PLANNING AND PROGRAMMING

1.1. Purpose. This chapter implements laws, incorporates DoD and Air Force policies, and provides basic guidance unique to family housing planning and programming. For more information about family housing planning and programming, see:

- AFI 32-1021, *Planning and Programming of Facility Construction Projects*.
- AFI 32-1032, *Planning and Programming of Real Property Maintenance Projects*.
- AFI 32-7001, Environmental Budgeting
- AFI 32-7061, Environmental Impact Analysis Process.

1.2. Program Overview:

1.2.1. Acquisition programs include:

- New and replacement construction.
- Domestic lease (including the former section 801 program).
- Foreign lease.
- Rental guarantee (formerly the section 802 program).
- Private-sector financing.
- No-cost acquisition.
- Interservice transfer.

1.2.2. Other programs include:

- Improvement (including minor improvements).
- Maintenance and repair (including minor alterations).
- Restoration or replacement for damaged or destroyed housing.

1.3. General Policy:

1.3.1. Funding Policy:

1.3.1.1. The MAJCOMs and bases use family housing funds to acquire, construct, replace, improve, operate, lease, maintain and repair houses and support facilities. Support facilities include:

- Family housing offices, maintenance facilities, and supply and storage facilities.
- Recreational, athletic and other community support facilities located in family housing areas for the exclusive use of the housing area residents.
- Utility distribution systems and associated protective or control devices including transformers, switch gears, manholes, and hydrants located in family housing areas for the exclusive use of the housing area residents.

1.3.1.2. MAJCOMs and bases use:

- Planning and design funds (P-714) to design projects under the new and replacement construction, and improvement programs.
- Maintenance and repair funds (P-722 funds) to plan and design projects in the maintenance and repair and restoration programs.

1.3.2. Approval Levels. Table 1.1 shows project approval levels and delegation authority.

1.3.3. Housing Requirements Analysis. Bases:

- Must identify surplus housing.
- Must perform a housing market analysis to ensure plans are not made to replace, improve, construct or acquire units the Air Force doesn't need. For instructions, follow the current Air Force Housing Market Analysis Guidance Manual.
- Support projects with housing market analyses that are less than 3 years old.

1.3.4. Housing Community Plan Requirements . Bases with more than 100 housing units must develop a housing community plan to construct, replace, improve, maintain, and repair family housing facilities. These plans must include:

- Floor plan designs for all unit types.
- Projected requirements.
- Plans for land use as defined in the Base Comprehensive Plan.
- Uses for existing housing stock.
- Requirements data based on the most current housing market analysis.

1.3.5. Restrictions on Subsequent Work. Bases should not undertake a replacement, improvement, minor improvement, major maintenance and repair or minor alteration project on a new unit or on a unit improved within 3 years after tenants moved in. **NOTE:** The 3-year limit doesn't apply when a project addresses health, safety, or life-threatening conditions or if the project falls under the auspices of a larger program such as a general energy efficiency upgrade program. In all cases, MAJCOMs must submit a copy of DD Form 1391, **FY 19 Military Construction Program**, to HQ USAF/CEH with full justification for not meeting the 3-year limit.

1.3.6. Alterations To Accommodate Physically Handicapped Family Members. Bases may alter housing units, as required, to accommodate the needs of handicapped family members.

1.3.7. Statutory Space Limit. See table 1.2 for the space limitations on constructing, acquiring, and improving family housing units.

1.3.7.1. Housing units may exceed the maximum net floor areas described in table 1.2 by 10 percent for:

- Officers holding special command positions designated by the Secretary of Defense.
- The commanding officer of a military installation.
- The senior noncommissioned officer of a military installations.

1.3.7.2. SAF/MII must approve any increase up to 5 percent in the maximum net floor area to:

- Award a turnkey contract.
- Purchase, lease, or convert housing units.

1.3.7.3. The total increase allowed by paragraphs 1.3.7.1. and 1.3.7.2. may not exceed 10 percent

1.3.7.4. Housing units may exceed the maximum net floor area by 300 square feet (28 square meters) for indoor activity rooms in family housing units located in harsh climates. Bases in harsh climates are those with more than 7,500 heating degree days annually, as defined in AFM 88-29, *Engineering Weather Data*.

1.3.7.5. *The Air Force Family Housing Guide* gives general guidance for calculating net floor areas.

1.3.8. Security Requirements. Bases may not use family housing funds to install, construct, or maintain security systems.

1.3.9. Environmental Requirements. Refer to AFI 32-7001, *Environmental Budgeting*, for applicable law and general guidance. Bases:

- Must correct all environmental hazards when required by law. Such hazards include:
- Underground storage tanks.
- Asbestos.
- Radon.
- Lead-based paint.
- Any other legislated environmental hazards.
- Must identify requirements and develop plans for correcting hazards. Address these requirements in projects maintaining, repairing, improving or constructing family housing.

1.3.10. Special Requirements for General Officer Quarters. For special policies and guidance for general officer quarters, refer to AFI 32-6003, *General Officer Quarters*. Bases:

- Include projects for upgrading general officer quarters or converting existing quarters to general officer quarters in the annual budget submission to the Congress.
- Should not consider out-of-cycle requests for such improvements unless they meet urgent requirements for safety, health, or security.

1.3.11. Special Requirements for Historic Housing Facilities. Bases:

- Use family housing funds to maintain historic housing units in livable condition.
- Work with the State Historic Preservation Officers to repair or improve units and make a reasonable effort to whole-house improve and preserve its historic significance.
- Consider major upgrading, alternative uses, or disposing of historic housing or support facilities if repair and maintenance costs become excessive.

1.3.12. Surplus and Substandard Housing. Bases:

- Limit work on surplus housing to minor maintenance and repair.
- Dispose of surplus housing when no longer economical to operate.

- Improve or replace substandard housing, if the Air Force still needs it, by FY97.
- Comply with McKinney Act before disposing of any units.

1.3.13. Programming Limit. The number of units proposed in acquisition and construction projects shall not exceed 90 percent of the projected housing deficit.

1.4. New and Replacement Construction Program (P-711 Funds). This program includes projects for acquiring, constructing or replacing existing family housing units, support facilities, or infrastructure.

1.4.1. Housing and Urban Development Verification. Before planning and programming a construction project, the base and MAJCOM must consult the local housing and urban development office to track available assets for alternative housing.

1.4.1.1. If no local housing and urban development assets exist, include housing and urban development verification in the construction program submittal.

1.4.2. The Congress approves all construction projects.

1.4.3. Bases and MAJCOMs submit these forms for approval:

- DD Form 1391, **FY 19 Military Construction Program**, and Tri-Service Cost Model, for new construction projects (see figures 1.1. and 1.2 for sample form)
- DD Form 1391, **FY 19 Military Construction Program**, and Tri-Service Cost Model, for replacement construction projects (see figures 1.3 and 1.4 for sample form).
- DD Form 1523, Military Family Housing Justification, for all acquisition projects (see figure 1.5 for sample form).
- DD Form 1391, **FY 19 Military Construction Program**, and deficiency detail data sheets for support facilities projects (see figures 1.6 and 1.7 for sample form).

1.5. Domestic Lease Program (P-725/6 Funds) (including the former section 801 program).

1.5.1. Authority. Under 10 U.S.C. 2828(a) and 2835, the Air Force may lease family housing units constructed or rehabilitated near a military installation within the United States.

1.5.2. Requirements:

1.5.2.1. Bases must justify leases using a housing market analysis less than 3 years old, and an economic analysis proving the build-to-lease would cost at least 5 percent less than new construction.

1.5.2.2. Bases may use short-term domestic leases as an interim solution for unforeseen housing requirements. Renew short-term leases annually.

1.5.2.3. When bases identify long-term housing requirements, they must develop plans for acquiring facilities or new construction.

1.5.2.4. The Congress sets domestic lease ceilings, annually. Lease ceilings cover utility, maintenance, and operational costs.

1.5.2.5. MAJCOMs and bases:

- Publicly advertise and competitively bid or negotiate domestic build-to-lease contracts.

- Maintain units under a separate contract during the term of the lease.
- Ensure that construction complies with national building codes supplemented by DoD standards.
- Ensure that build-to-lease contracts don't exceed 20 years (not including the construction period) and offer the Government the right of first refusal to acquire the facilities at the end of the lease period.
- Structure build-to-lease contracts so that the Government owns the land option. This keeps the bidding open to all interested developers. NOTE: This procedure doesn't preclude developers from proposing projects for independently owned land.

1.5.2.6. Build-to-lease projects are subject to annual line-item authorization and annual appropriation. They must comply with Office of Management and Budget scoring policy.

1.5.2.7. SAF/MII must notify the Congress of these leases and allow a 21-day waiting period before awarding a contract.

1.6. Foreign Lease Program (P-723/4 Funds):

1.6.1. Authority. Under 10 U.S.C. 2828(c), the Air Force may lease family housing in a foreign country.

1.6.2. Requirements:

1.6.2.1. Bases must validate a housing shortage with a housing market analysis and perform an economic analysis showing that leasing costs less than alternative housing options.

1.6.2.2. Bases may use short-term foreign leases as an interim solution to unforeseen housing requirements. They must renew short-term leases annually.

1.6.2.3. If bases identify a long-term housing requirement, they must develop plans for acquiring or constructing housing.

1.6.2.4. The Congress sets a foreign lease ceiling annually. The lease ceilings cover utility, maintenance, and operational costs.

1.6.2.5. MAJCOMs and bases:

- Publicly advertise and competitively bid or negotiate foreign build-to-lease contracts.
- Ensure that construction complies with local building codes and supplemental DoD specifications.
- Must limit foreign build-to-lease contracts to 10 years.
- Must include a buy-out provision stating the buy-out cost for each year of the lease period.

1.6.2.6. The Congress limits the total number of units leased under this program.

1.7. Rental Guarantee Program (formerly the section 802 program).

1.7.1. Authority. Under 10 U.S.C. 2836, the Air Force may enter into a rental guarantee lease within the United States. This program allows the services to enter into lease agreements guaranteeing tenants will occupy rental housing on or near installations.

1.7.2. Rental guarantee projects are subject to line-item authorization and annual appropriation. SAF/MII must notify the Congress and wait 21 days before awarding a contract.

1.7.3. Rental guarantees must comply with the Office of Management and Budget scoring policy.

1.8. Private Sector Financing Program:

1.8.1. Authority. Under 10 U.S.C. 2667, the Air Force may lease land to developers to design, construct, operate, and maintain privately-owned family housing for rent. Lease agreements between the landlord and Government don't guarantee occupancy. Agreement may include an escalation clause to cover operation and maintenance costs.

1.8.2. Requirements:

1.8.2.1. Housing officers must offer the rental units to all eligible military families before offering them to civilian families.

1.8.2.2. Families occupy those units on a voluntary bases and pay rent directly to the contractor, developer, or owner.

1.8.2.3. The Air Force sets the rental rate target at basic allowance for quarters plus variable housing allowance.

1.9. No-Cost Acquisition Program:

1.9.1. Authority. The Air Force may acquire family housing units at no cost to the Government under 10 U.S.C. 2822. This program doesn't require line-item authorization.

1.9.2. Requirements:

1.9.2.1. Bases may use family housing funds for improving, operating and maintaining housing.

1.9.2.2. SAF/MII must approve no-cost acquisition projects before the installation acquires family housing units.

1.10. Interservice Transfer Program:

1.10.1. This program permits the transfer of family housing between services. The Secretaries of the respective services and Office of the Secretary of Defense (OSD) must approve all transfers.

1.11. Improvement Program (P-713 Funds):

1.11.1. Overview. This program improves existing family housing inventory to meet whole-house and whole-neighborhood standards and covers all required maintenance and repair to extend the life of the house for 25 years. Improvement projects:

- Alter, add, expand, or extend the life of an existing housing facility.
- Upgrade related housing facilities such as family housing offices and housing maintenance facilities.
- Upgrade or construct other community support facilities such as parking areas, utilities, bus shelters and playgrounds.

1.11.2. Statutory Improvement Cost Limit. The Congress sets the statutory unit-cost limit for housing improvements and concurrent maintenance and repair. The Congress sets the current limit at:

- \$50,000, multiplied by the area cost factor, per housing unit at the time of the contract award.

- \$60,000, multiplied by the area cost factor, per housing unit for improvements necessary to make the unit suitable for a handicapped person.

1.11.2.1. In foreign locations, bases may not apply the area cost factor to increase the cost limit.

NOTE: Cost increases after contract award resulting solely from varying foreign currency exchange rates don't constitute a violation of this limit. **EXCEPTION:** This limit doesn't apply to:

- Projects authorized for restoring or replacing damaged or destroyed housing units.
- Projects maintaining and repairing facilities or making minor alterations.

1.11.2.2. HQ USAF/CEH issues a call letter to MAJCOMs every year to prepare the *Budget Estimate Submission*. MAJCOMs identify those improvement projects where the costs of the most expensive unit exceeds the statutory improvement cost limit. Projects are included in the annual President's Budget for approval by the Congress.

1.11.2.3. To request a waiver, bases must perform an economic analysis in accordance with the latest *Air Force Housing Economic Analysis Guidance Manual* and show improving the facility is more cost effective than other alternatives.

1.11.2.4. SAF/MII may waive the cost limit by notifying the Congress with an economic analysis submission and wait for a 21-day period.

1.11.3. Substituting Improvement Projects with Replacement Projects . If an authorized improvement project's cost exceeds 70 percent of the cost to replace the housing and an economic analysis further shows the improvement project no longer is the most cost effective alternative, bases may substitute a replacement project at the improvement project program amount.

1.11.3.1. SAF/MII must approve project substitutions, notify the Congress, and wait 21 days before the contract can be awarded. The notification includes the economic analysis and revised DD Form 1391.

1.11.4. Programming Improvement Projects:

1.11.4.1. Bases must program improvement projects to whole-house and whole-neighborhood criteria, even if the projected costs exceed the statutory improvement cost limit. If projected costs exceed the limit, bases must perform an economic analysis to determine whether to program the project under the improvement program or the construction (replacement) program.

1.11.4.2. Bases plan improvements and all necessary maintenance and repair work as well as minor alterations that will bring units up to whole-house standards. Improvement projects must comply with the base's housing community plan.

1.11.4.3. Bases plan minor improvement projects for low-cost, small-scale projects to improve existing housing facilities or housing community areas to include concurrent maintenance or repair work.

1.11.4.4. Minor improvement projects must not exceed the improvement cost limit. In calculating the statutory improvement cost limit, include the total cost of all improvement, major maintenance and repair, and minor alteration work planned or accomplished during the current fiscal year.

1.11.5. Out-of-Cycle Improvement Projects:

1.11.5.1. MAJCOMs may apply to HQ USAF/CEH for approval of urgent, out-of-cycle requirements that address safety, health, or other life-threatening issues.

1.11.5.2. SAF/MII must approve requests for out-of-cycle improvements contingent upon the availability of funds. Out-of-cycle improvement projects may not exceed the improvement cost limit.

1.11.6. Improvement project approval levels are listed in table 1.1.

1.11.7. See figure 1.8 for a sample of DD Form 1391, **FY 19 Military Construction Program**, for improvement projects.

1.12. Maintenance and Repair Program (P-722 Funds):

1.12.1. Overview. This program covers major and minor maintenance and repair (see Section B - Glossary of Terms) required to preserve family housing units and support facilities. It also covers general officers quarters and non-general officers quarters maintenance and repair thresholds, and minor alterations required in conjunction with maintenance and repair.

1.12.2. Minor Alterations. Construction type work normally performed in support of a maintenance and repair project.

1.12.2.1. Minor alteration projects:

- Can improve housing units, support facilities, and streets (including sidewalks), and utility systems.
- Are funded with P-722 funds.
- Have approval limits listed in table 1.1.

1.12.2.2. Bases can't use minor alteration authority on housing units to:

- Increase the size of a unit.
- Increase the number of rooms in a unit.
- Add air conditioning.
- Add or alter exterior appurtenances such as garages, carports, driveways, storage sheds, detached facilities, patios, sprinkler systems, fences, decks, or porches.

1.12.2.3. Bases will use the improvement program (P-713 funds) to add an appurtenance, unless overriding justification exists. **EXCEPTION:** Occupants may use family housing maintenance and repair (P-722 funds) to add patios, decks, and fences under the family housing self-help program.

1.12.2.4. Bases that add exterior appurtenances under the self-help program for senior or general officer quarters must report work to SAF/MII through MAJCOMs and HQ USAF/CEH at the end of September. This annual report must justify the work.

1.12.2.5. Bases must not use P-722 funds for minor alterations on non-dwelling units to:

- Increase the size of any facility.
- Add new exterior appurtenances.

- Extend streets.
- Construct new parking areas, carports or garages.
- Increase the capacity of utility systems.
- Expand recreation facilities.

1.12.2.6. MAJCOMs and bases track the cost and scope of work for minor alterations to ensure they don't exceed the per-unit and per-project thresholds (see table 1.1) and they haven't violated any restrictions.

1.12.3. Congressional Notification for Exceeding the General Officers Quarters and Non-General Officers Quarters Maintenance and Repair Thresholds:

1.12.3.1. The general officers quarters maintenance and repair threshold, set at \$25,000:

- Places an annual obligation limit on total costs for maintaining, repairing, and making minor alterations on all general officer quarters .
- Excludes costs for design and contract claims.

1.12.3.2. The non-general officers quarters maintenance and repair threshold, set at \$15,000:

- Places an annual obligation limit on major maintenance and repair and alteration work, accomplished by job order, work order, or contract, on all non-general officers quarters units.
- Excludes costs for design and contract claims.

1.12.3.3. HQ USAF/ILEH issues a call letter to MAJCOMs every year to prepare the Budget Estimate Submission. MAJCOMs identify those maintenance and repair projects where general officers quarters and non-general officers quarters maintenance and repair thresholds are to be exceeded. Projects are included in the annual President's Budget for approval by the Congress. Bases:

- Must execute all work approved over the non-general officers quarters maintenance and repair threshold no later than 1 year following the program year.
- May not exceed the maintenance and repair thresholds until the Congress has approved.
- Can increase the per-unit cost threshold for all non-general officer quarters in a project by up to 25 percent of the high unit cost, but the total project cost cannot exceed 25 percent of the approved project cost threshold.
- Can reduce the non-general officer quarters project scope by up to 25 percent of the project previously notified to Congress. However, the project scope cannot be reduced when costs are increased above per-unit and/or project cost thresholds.
- May not exceed the non-general officer quarters 25 percent flexibility without prior congressional approval.

1.12.4. Out-of-Cycle Notification To Exceed General Officers Quarters or Non- General Officers Quarters Maintenance and Repair Thresholds:

1.12.4.1. MAJCOMs may apply to HQ USAF/CEH for consideration of urgent maintenance and repair requirements. In supporting documentation, MAJCOMs must include DD Form 1391 and explain:

- Why they didn't identify the requirement for budget submission.
- The requirement's urgency.
- The impact of a delay.

1.12.4.2. SAF/MII must approve out-of-cycle projects exceeding general officers quarters and non-general officers quarters maintenance and repair thresholds, and submit to the Congress for approval.

1.12.4.3. The Congress limits submission of out-of-cycle maintenance and repair projects exceeding the general officers quarters maintenance and repair threshold to once per year.

1.12.5. Unforeseen Environmental Hazard Remediation Costs:

1.12.5.1. Costs to correct unforeseen environmental hazards such as removing asbestos, mitigating radon, removing and abating lead-based paint, and correcting other known legislated environmental hazards in an ongoing contract may exceed maintenance and repair thresholds. MAJCOMs must notify HQ USAF/CEH at the end of March and September each year listing each instance where maintenance and repair thresholds were exceeded because of unforeseen environmental hazard remediation. Include information about work scope and break out costs.

1.12.5.2. SAF/MII notifies the Congress after-the-fact semiannually.

1.12.6. Self-Help Work. Bases may not violate approval authority levels, statutory space, improvement cost limits, or general officers quarters and non-general officers quarters maintenance and repair thresholds when programming family housing self-help work.

1.12.7. See table 1.1 for approval levels.

1.12.8. See figure 1.9 for sample DD Form 1391, **FY 19 Military Construction Program**, maintenance and repair project.

1.13. Restoration or Replacement for Damaged or Destroyed Housing Program (P-711/P-713/P-722 Funds):

1.13.1. Overview. This program provides funds for restoring, or replacing family housing units damaged by fire, hurricanes, earthquakes, storms, or other disasters. Bases:

- Use P-722 funds for immediate temporary repairs to make units livable.
- Program permanent repairs, as quickly as possible, using either P-722 or P-713 funds. Program replacement facility projects using P-711 funds.
- Include all known maintenance, repair, and improvement requirements resulting from unforeseen events.
- Notify MAJCOMs and HQ USAF/CEH. SAF/MII notifies the Congress, after the fact, when restoring damaged or destroyed housing units or when performing emergency work, exceeding general officers quarters or non-general officers quarters maintenance and repair thresholds.
- Identify the per-unit cost to restore each unit in multi-family structures and include this figure in the cost estimate.

1.13.1.1. The statutory limit on improvement costs (P-713 funds) doesn't apply to damaged or destroyed facilities.

1.13.1.2. The approval authority, as delegated in table 1.1, must determine the need for repair or replacement due to damage caused by unforeseen events and not from long-term deterioration.

1.13.1.3. MAJCOMs submit to HQ USAF/CEH any per unit restoration costs that exceed 70 percent of replacement costs or \$100,000, whichever is less; or any changes to the programmed amount for a previously approved project that exceeds the 70 percent or \$100,000 threshold. Identify the total extent of damage and other projects programmed to restore damaged or destroyed units. SAF/MII approves projects that exceed 70 percent of the replacement costs or \$100,000 per unit.

1.13.1.4. See table 1.1 for approval levels.

1.13.1.5. See figure 1.10 for sample DD Form 1391, **FY 19 Military Construction Program, Restoration Projects**

Table 1.1. Project Approval Levels & Delegation Authority.

TYPE OF WORK	FUND TYPE	MAJCOM	SAF AND AF	MAJCOM DELEGATION AUTHORITY
MAINTENANCE&REPAIR	P-722	<u>Non-General Officer Quarter:</u> \$15,000 (1) per unit per year and less than 50% replacement cost, unlimited per project. <u>General Officer Quarter:</u> \$25,000 (1) per unit per year and less than 50% replacement cost, unlimited per project	In excess of 50% but less than 70% replacement cost	Cost not to exceed \$1,000,000 per project (not below Deputy Base Civil Engineer)
MINOR ALTERATIONS	P-722	<u>Dwelling Unit:</u> \$3,000 (2) per unit per year, \$200,000 per project. <u>Support Facilities:</u> \$5,000 per maintenance and repair project. <u>Streets and Utilities:</u> \$25,000 per maintenance and repair project.	Project or unit cost exceeding MAJCOM limits	Lowest practical level
IMPROVEMENTS	P-713	(3)	Not to exceed statutory cost and space limits	(3)

MINOR IMPROVEMENTS	P-713	Dwelling Unit: \$200,000 per project , not to exceed statutory cost and space limits, except Senior officer quarter and general officer quarter projects. <u>Non-Dwelling Unit</u> : \$10,000 per project.	AF/CE: Senior Officer Quarter project SAF/MII: General Officer Quarter project	(3)
RESTORATION	P-711/P-713/P-722	Less than 70% replacement cost or \$100,000 per unit whichever is less	Greater than 70% replacement cost or \$100,000 per unit	Less than 70% replacement cost or \$100,000 per unit whichever is less (Not below Installation Commander)
CONSTRUCTION	P-711	3	(3)	(3)

Table 1.2. Statutory Space Limit.

L	A	B	C	D
I	Military Pay Grade	Maximum Number of Bedrooms	Maximum Net Floor Area (Square Feet)	Maximum Net Floor Area (Square Meters)
N				
E				
1	0-7 and above	4	2,100	195
2	0-6		1,700	158
3	0-4 and 0-5		1,550	144
4		3	1,400	130
5	0-1 through 0-3, E-7 through E-9	5	1,550	144
6		4	1,450	135
7		3	1,350	125
8		2	950	88
9	E-1 through E-6	5	1,550	144
10		4	1,350	125
11		3	1,200	111
12		2	950	88

Figure 1.1. Sample DD Form 1391, New Construction Project.

1. COMPONENT AIR FORCE		FY 1996 MILITARY CONSTRUCTION PROJECT DATA			2. DATE	
3. INSTALLATION AND LOCATION BLUE AIR FORCE BASE, SOMEWHERE				4. PROJECT TITLE MILITARY FAMILY HOUSING (PHASE I)		
5. PROGRAM ELEMENT 8.87.41		6. CATEGORY CODE 711-142		7. PROJECT NUMBER XXXXX880001		8. PROJECT COST (\$000) 3.262
9. COST ESTIMATES						
ITEM				U/M	QUANTITY	COST (\$000)
FAMILY HOUSING						2,640
MILITARY FAMILY HOUSING				UN	34	(2,604)
SOLAR SPACE				LS		(36)
SUPPORTING FACILITIES						305
SITE PREPARATION				LS		(50)
ROADS AND PAVINGS				LS		(100)
UTILITIES				LS		(95)
LANDSCAPING				LS		(35)
RECREATION				LS		(25)
SUBTOTAL				LS		2,945
CONTINGENCY (5%)						147
TOTAL CONTRACT COST						3,092
SUPERVISION, INSPECTION AND OVERHEAD (5.5%)						170
TOTAL REQUEST						3,262
AREA COST FACTOR 1.05						
10. DESCRIPTION OF PROPOSED CONSTRUCTION:						
Construct 34 single and multiplex family housing units with all necessary amenities and supporting facilities. Project includes site preparation, attached single car garages, air conditioning, energy conserving solar features, parking, exterior patios and privacy fencing, support infrastructure of roads, and utilities, neighborhood playgrounds, recreation areas, and all landscaping.						
<u>UNIT TYPE</u>		<u>NET AREA</u>	<u>PROJECTS/FACTORS</u>	<u>\$/NSF</u>	<u>NO. UNITS</u>	<u>TOTAL COST</u>
JRENL	2BR	950	1.08	57	3	175,446
JRENL	3BR	1200	1.08	57	2	147,744
JNCO	3BR	950	1.08	57	13	175,446
JNCO	2BR	1200	1.08	57	10	738,720
JNCO	3BR	1350	1.08	57	4	332,424
SNCO	3BR	1350	1.08	57	6	498,636
SNCO	4BR	1450	1.08	57	4	357,048
CGO	3BR	1350	1.08	57	1	83,106
FGO	4BR	1550	1.08	57	1	95,418
					34	2,603,988
11. REQUIREMENT: 1,000 UN ADEQUATE: 750 UN SUBSTANDARD: 50 UN						
PROJECT: Military Family Housing. (Current Mission)						
REQUIREMENT: This project is required to provide modern and efficient housing for military members and their dependents stationed at Blue AFB. All units will meet modern housing standards and are programmed in accordance with the Housing Community Plan, phase xx. The housing will provide a safe, comfortable, and appealing living environment comparable to the off-base civilian community. The design will provide a modern kitchen, living room, family room, bedroom and bath configuration, with ample interior and exterior storage. The number of bedrooms will						
DD Form 1391, DEC 76			PREVIOUS EDITIONS MAY BE USED INTERNALLY UNTIL EXHAUSTED			PAGE NO.

1. COMPONENT AIR FORCE	FY 1996 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
3. INSTALLATION AND LOCATION BLUE AIR FORCE BASE. SOMEWHERE		
4. PROJECT TITLE MILITARY FAMILY HOUSING (PHASE 1)		5. PROJECT NUMBER XXXX880001

range from two or four, as identified in the most recent housing requirements survey. Units will be provided with a single car garage and exterior parking for a second vehicle. Space will also be provided for visitor parking. The housing area will be provided with an adequate support infrastructure of roads and utilities. The base currently has 800 housing units versus a validated requirement for 1000. This is the first phase of a multi-phase initiative to construct an additional 200 housing units for the base.

CURRENT SITUATION: The most recent Housing Market Analysis for the base shows a deficit of 200 housing units over and above adequate or affordable housing available in the local community. The shortage of suitable housing forces many military families to occupy substandard housing thus affecting family morale, or forcing member to occupy housing at rents outside the acceptable range, causing unacceptable financial hardships as other portions of limited budgets are used to offset high housing costs.

IMPACT IF NOT PROVIDED: There are no alternatives to living in substandard or expensive housing if families desire to avoid lengthy and costly (both financially and psychologically) "voluntary" separations. The impact will be major morale and/or financial problems for the affected families.

ADDITIONAL: (PI 26) This project meets the criteria/scope specified in Part II of Military Handbook 1190, "Facility Planning and Design Guide". (PI 23, modified as necessary) An economic analysis has been prepared comparing the alternatives of new construction, acquisition, and status quo operation. The local school authority indicates a capability exists to accept the increase in the student population generated by this project. No additional school construction will be required.

Figure 1.2. Sample Tri-Service Family Housing Cost Model (New Construction).

SERVICE <u>AIR FORCE</u>	LOCATION <u>BLUE AIR FORCE BASE, SOMEWHERE</u>
BASELINE:	
(34) (1244) (57)	= <u>\$2,411,099</u>
(No. Units) (ANSF) (\$/NSF)	= 5' Line Cost
PROJECT FACTORS:	
(1.05) (1.05) (0.98)	= <u>108</u>
(area cost factor) (Project Size) (Unit Size) =	Project Factor
HOUSING COST:	
(2,411,099) (1.08)	= <u>\$2,603,987</u>
(5' Line Cost) (Project Factor)	= Housing Cost
(1,000) (1.05) (34)	= <u>\$35,700</u>
(Solar Unit Cost) (area cost factor) (Units)	= Total Project Solar Cost
([2,603,987] + [35,700]) / (34)	= <u>\$77,638</u>
([Housing Cost] + [Solar]) / (No. Units)	= Average Unit Cost
SUPPORTING COST:	
MANAGEMENT OFFICE	
MAINTENANCE FACILITY	<u>0</u>
SITE PREPARATION	<u>50,000</u>
ROADS AND PAVING	<u>100,000</u>
UTILITIES	<u>95,000</u>
LANDSCAPING	<u>35,000</u>
RECREATION	<u>25,000</u>
SPECIAL CONSTRUCTION FEATURES	<u>0</u>
OTHER (SPECIFY)	<u>0</u>
Support Cost	<u>305,000</u>
SUMMARY:	
(2,603,987) + (35,700) + (305,000) =	<u>\$2,944,687</u>
(Housing Cost) + (Solar Cost) + (Support Cost) =	Subtotal
(2,944,687) (1.050) (1.055) = <u>\$3,261,976</u> Say:	<u>\$3,262,000</u>
(Subtotal) (Contingency) (SIOH) = Project Cost	(Round)
(3,262,000) / (34) (1244) (1.05) =	<u>\$73</u>
(Project Cost) / (# of Units) (ANSF) (area cost factor) =	Total Project Cost/SF
<hr/>	
<u>PROJECT SIZE FACTOR - (# OF UNITS)</u>	<u>UNIT SIZE - (AVG NET SF)</u>
1 to 4 = 1.15 100 to 199 = 1.00	600 to 749 = .05 1051.to.1150 = 0.99
5 to 19 = 1.10 200 to 299 = 0.98	750 to 849 = 1.03 1151 to 1250 = 0.98
20 to 49 = 1.05 300 to 499 = 0.96	850 to 949 = 1.01 1251 to 1350 = 0.97
50 to 99 = 1.02 500+ = 0.95	950-1050 = 1.00 1351+ = 0.96

Figure 1.3. Sample Replacement Construction Project.

1. COMPONENT AIR FORCE	FY 1996 MILITARY CONSTRUCTION PROJECT DATA			2. DATE																																																
3. INSTALLATION AND LOCATION BLUE AIR FORCE BASE, ELSEWHERE			4. PROJECT TITLE REPLACE MILITARY FAMILY HOUSING (PHASE 2)																																																	
5. PROGRAM ELEMENT 8.87.41	6. CATEGORY CODE 711-142	7. PROJECT NUMBER XXXX960001	8. PROJECT COST (\$000) 3,478																																																	
9. COST ESTIMATES																																																				
ITEM	U/M	QUANTITY	UNIT COST	COST (\$000)																																																
FAMILY HOUSING				2,635																																																
REPLACE MILITARY FAMILY HOUSING	UN	35	74,282	(2,600)																																																
SOLAR SPACE	LS			(35)																																																
SUPPORTING FACILITIES				505																																																
SITE PREPARATION	LS			(50)																																																
ROADS AND PAVINGS	LS			(100)																																																
UTILITIES	LS			(95)																																																
LANDSCAPING	LS			(35)																																																
RECREATION	LS			(25)																																																
DEMOLITION & ASBESTOS/LEAD REMOVAL	LS			(200)																																																
SUBTOTAL				3,140																																																
CONTINGENCY (5%)				157																																																
TOTAL CONTRACT COST				3,297																																																
SUPERVISION, INSPECTION AND OVERHEAD (5.5%)				181																																																
TOTAL REQUEST				3,478																																																
AREA COST FACTOR .99																																																				
10. DESCRIPTION OF PROPOSED CONSTRUCTION: Replace 35 housing units. Includes demolition, site clearing, replacement/upgrade of utility systems and roads, and construction of new single and multiplex units. Provides normal amenities to include parking, air conditioning, exterior patios and privacy fencing, neighborhood playgrounds, and recreation areas. Includes demolition, asbestos and lead-based paint removal.																																																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="text-align: left;">UNIT TYPE</th> <th style="text-align: center;">NET AREA</th> <th style="text-align: center;">PROJECTS/FACTORS</th> <th style="text-align: center;">NO. NSF</th> <th style="text-align: center;">UNITS</th> <th style="text-align: right;">TOTAL COST</th> </tr> <tr> <td>JRENL 3BR</td> <td style="text-align: center;">1200</td> <td style="text-align: center;">1.01</td> <td style="text-align: center;">57</td> <td style="text-align: center;">5</td> <td style="text-align: right;">345,420</td> </tr> <tr> <td>JNCO 2BR</td> <td style="text-align: center;">950</td> <td style="text-align: center;">1.01</td> <td style="text-align: center;">57</td> <td style="text-align: center;">3</td> <td style="text-align: right;">164,075</td> </tr> <tr> <td>JNCO 3BR</td> <td style="text-align: center;">1200</td> <td style="text-align: center;">1.01</td> <td style="text-align: center;">57</td> <td style="text-align: center;">14</td> <td style="text-align: right;">967,176</td> </tr> <tr> <td>SNCO 4BR</td> <td style="text-align: center;">1450</td> <td style="text-align: center;">1.01</td> <td style="text-align: center;">57</td> <td style="text-align: center;">10</td> <td style="text-align: right;">834,765</td> </tr> <tr> <td>CGO 3BR</td> <td style="text-align: center;">1350</td> <td style="text-align: center;">1.01</td> <td style="text-align: center;">57</td> <td style="text-align: center;">2</td> <td style="text-align: right;">155,439</td> </tr> <tr> <td>GOQ 4BR</td> <td style="text-align: center;">3210</td> <td style="text-align: center;">1.01</td> <td style="text-align: center;">57</td> <td style="text-align: center;">1</td> <td style="text-align: right;">132,987</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td style="text-align: center;">35</td> <td style="text-align: right;">2,599,862</td> </tr> </table>					UNIT TYPE	NET AREA	PROJECTS/FACTORS	NO. NSF	UNITS	TOTAL COST	JRENL 3BR	1200	1.01	57	5	345,420	JNCO 2BR	950	1.01	57	3	164,075	JNCO 3BR	1200	1.01	57	14	967,176	SNCO 4BR	1450	1.01	57	10	834,765	CGO 3BR	1350	1.01	57	2	155,439	GOQ 4BR	3210	1.01	57	1	132,987					35	2,599,862
UNIT TYPE	NET AREA	PROJECTS/FACTORS	NO. NSF	UNITS	TOTAL COST																																															
JRENL 3BR	1200	1.01	57	5	345,420																																															
JNCO 2BR	950	1.01	57	3	164,075																																															
JNCO 3BR	1200	1.01	57	14	967,176																																															
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CGO 3BR	1350	1.01	57	2	155,439																																															
GOQ 4BR	3210	1.01	57	1	132,987																																															
				35	2,599,862																																															
11. REQUIREMENT: 1,000 UN ADEQUATE: 600 UN SUBSTANDARD: 400 UN PROJECT: Replace Military Family Housing (Phase 2). Project includes replacement of one General Officers Quarters.(Current Mission) REQUIREMENT: This project is required to provide modern and efficient replacement housing for military members and their dependents stationed at Blue AFB. All units will meet "whole house" standards and are programmed in accordance with the Housing Community Plan, phase xx. Replacement housing will provide a safe, comfortable, and appealing living environment comparable to the off-base civilian community. This is the second of multiple phases to																																																				

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PREVIOUS EDITIONS MAY BE USED INTERNALLY UNTIL EXHAUSTED
PAGE NO.

1-3

1. COMPONENT AIR FORCE	FY 1996 MILITARY CONSTRUCTION PROJECT DATA		2. DATE
3. INSTALLATION AND LOCATION BLUE AIR FORCE BASE, ELSEWHERE			
4. PROJECT TITLE REPLACE MILITARY FAMILY HOUSING (PHASE 2)		5. PROJECT NUMBER XXXX960001	
<p>provide adequate housing for base personnel. Of the 500 housing units to be replaced in this multi-phase initiative, 100 are completed or included in prior programs, and 365 will follow in subsequent phases. The replacement housing will provide a modern kitchen, living room, family room, bedroom and bath configuration, with ample interior and exterior storage and a single car garage. Exterior parking will be provided for a second occupant vehicle and guests. The basic neighborhood support infrastructure will be upgraded to meet modern housing needs. Neighborhood enhancements will include landscaping, playgrounds, and recreation areas.</p> <p>CURRENT SITUATION: This project replaces 35 housing units which were constructed in 1948. These 48-year-old houses are showing the effects of age and continuous heavy use. They have had no major upgrades since construction, and do not meet the needs of today's families, nor do they provide a modern home environment. Roofs, walls, foundations and exterior pavements require major repair or replacement owing to the effects of age and the environment. Roof structures show signs of rot; leaks have made already inadequate (by today's standards) insulation even less effective. Foundation and pavements are showing signs of failure owing to settlement. Plumbing and electrical systems are antiquated and do not meet current standards for efficiency or safety. Housing interiors are generally inadequate by any modern criteria. Bedrooms are small and lack adequate closet space. Bathrooms are small, and fixtures are outdated and energy inefficient. Kitchens have inadequate storage and counterspace, cabinets are old and countertops and sinks are badly worn. Flooring throughout the house is outdated, and contains evidence of asbestos. Plumbing and electrical systems are outdated and do not meet modern building codes. There is no Ground Fault Interrupter Circuit protection and many electrical outlets lack grounding protection. Lighting systems throughout the houses are inefficient and require replacement. Heating and air conditioning systems require upgrade and replacement. PAINT A "PICTURE" of the condition of the existing houses.</p> <p>IMPACT IF NOT PROVIDED: Major morale problems will result if this replacement initiative is not supported. Some people will continue to occupy substandard housing while neighbors and friends are in new, replaced units. The housing will continue to be occupied until it becomes totally uninhabitable because adequate, affordable off-base housing is not available. The current Housing Market Analysis shows an on-base housing deficit of xxx units. Without this and subsequent phases of this initiative, costly piecemeal repairs will continue with no improvement in the living quality.</p> <p>ADDITIONAL: (PI 26) This project meets the criteria/scope specified in Part II of Military Handbook 1190, "Facility Planning and Design Guide". (PI 23) An economic analysis has been prepared comparing the alternatives of new construction, improvement, and status quo operation. Based on the net present values and benefit of the respective alternatives, new construction was found to be the most cost effective over the life of the project. Since this is replacement housing, there will be no increase in the student population or impact on the ability of the local school district to support base dependents.</p>			

Figure 1.4. Sample Tri-Service Family Housing Cost Model (Replacement Construction).

SERVICE AIR FORCE

LOCATION BLUE AIR FORCE BASE, SOMEWHERE

BASELINE:

(34) (1290) (57)

=

\$2,574,119

(No. Units) (ANSF) (\$/NSF)

=

5' Line Cost

PROJECT FACTORS:

(0.99) (1.05) (0.97)

=

1.01

(area cost factor) (Project Size) (Unit Size)

=

Project Factor

HOUSING COST:

(2,574,119) (1.01)

=

\$2,599,861

(5' Line Cost) (Project Factor)

=

Housing Cost

(1,000) (0.99) (35)

=

\$34,650

(Solar Unit Cost) (area cost factor) (Units)

=

Total Project Solar Cost

([2,599,861] + [34,650]) / (35)

=

\$75,272

((Housing Cost) + (Solar)) / (No. Units)

=

Average Unit Cost

SUPPORTING COST:

MANAGEMENT OFFICE

MAINTENANCE FACILITY

0

SITE PREPARATION

50,000

ROADS AND PAVING

100,000

UTILITIES

95,000

LANDSCAPING

35,000

RECREATION

25,000

SPECIAL CONSTRUCTION FEATURES

0

OTHER (SPECIFY)

200,000

Support Cost

505,000

SUMMARY:

(2,599,861) + (34,650) + (505,000)

=

\$3,139,511

(Housing Cost) + (Solar Cost) + (Support Cost)

=

Subtotal

(2,944,687) (1.050) (1.055)

=

\$3,477,793 Say:

(Subtotal) (Contingency) (SIOH)

=

Project Cost

(3,478,000) / (35) (1290) (0.99)

=

\$78

(Project Cost) / (# of Units) (ANSF) (area cost factor)

=

Total Project Cost/SF

PROJECT SIZE FACTOR - (# OF UNITS)				UNIT SIZE - (AVG NET SF)			
1 to 4 = 1.15	100 to 199	=	1.00	600 to 749 = .05	1051 to 1150	=	0.99
5 to 19 = 1.10	200 to 299	=	0.98	750 to 849 = 1.03	1151 to 1250	=	0.98
20 to 49 = 1.05	300 to 499	=	0.96	850 to 949 = 1.01	1251 to 1350	=	0.97
50 to 99 = 1.02	500+	=	0.95	950 to 1050 = 1.00	1351+	=	0.96

Figure 1.5. Sample DD Form 1523, Military Family Housing Justification.

MILITARY FAMILY HOUSING JUSTIFICATION				1. DATE OF REPORT (YYMMDD)	2. FISCAL YEAR 1986	REPORT CONTROL SYMBOL DD-A&L (AR) 1716		
3. DOD COMPONENT AIR FORCE		4. REPORTING INSTALLATION						
		a. NAME BLUE AIR FORCE BASE		b. LOCATION TEN MILES SOUTHEAST OF BLUE CITY, SOMEWHERE				
5. DATA AS OF 31 JANUARY 1994								
ANALYSIS OF REQUIREMENTS AND ASSETS	CURRENT				PROJECTED			
	OFFICER (a)	E9 - E4 (b)	E3 - E1 (c)	TOTAL (c)	OFFICER (a)	E9 - E4 (b)	E3 - E1 (c)	TOTAL (c)
6. TOTAL PERSONNEL STRENGTH	10	94	32	136	9	96	34	139
7. PERMANENT PARTY PERSONNEL	10	94	32	136	9	96	34	139
8. GROSS FAMILY HOUSING REQUIREMENTS	10	66	18	94	7	64	20	91
9. TOTAL UNACCEPTABLY HOUSED (a + b + c)								
a. INVOLUNTARILY SEPARATED								
b. IN MILITARY HOUSING TO BE DISPOSED/REPLACED								
c. UNACCEPTABLY HOUSED - IN COMMUNITY								
10. VOLUNTARY SEPARATIONS	4	2		6		2		2
11. EFFECTIVE HOUSING REQUIREMENTS	6	64	18	88	7	62	20	89
12. HOUSING ASSETS (a + b)	2	20	4	26	2	18	4	24
a. UNDER MILITARY CONTROL								
(1) Housed in Existing DoD Owned/Controlled								
(2) Under Contract/Approved								
(3) Vacant								
(4) Inactive								
b. PRIVATE HOUSING	2	20	4	26	2	18	4	24
(1) Acceptably Housed	2	20	4	26				
(2) Acceptable Vacant Rental								
13. EFFECTIVE HOUSING DEFICIT	2	29	8	39	3	29	11	43
14. PROPOSED PROJECT					2	27	5	34
15. REMARKS (Specify item number)								

DD Form 1523, NOV 90 (EG)

Previous editions are obsolete.

Designed using Perform Pro, WHS/DIOR, Apr 97

Figure 1.6. Sample DD Form 1391, Support Facilities Project.

1. COMPONENT AIR FORCE	FY 1996 MILITARY CONSTRUCTION PROJECT DATA			2. DATE
3. INSTALLATION AND LOCATION BLUE AIR FORCE BASE, NOWHERE			4. PROJECT TITLE FAMILY HOUSING MANAGEMENT FACILITY	
5. PROGRAM ELEMENT 8.87.41	6. CATEGORY CODE 610-119	7. PROJECT NUMBER XRMM971993	8. PROJECT COST (\$000) 569	
9. COST ESTIMATES				
ITEM	U/M	QUANTITY	UNIT COST	COST (\$000)
FAMILY HOUSING MANAGEMENT FACILITY	SF	4,500	85	383
SUPPORTING FACILITIES				130
SITE IMPROVEMENTS	LS			(25)
UTILITIES	LS			(25)
PAVEMENTS	LS			(50)
LANDSCAPING	LS			(10)
DEMOLITION	LS			(5)
PREWIRED WORKSTATIONS	LS			(15)
SUBTOTAL				513
CONTINGENCY (5%)				26
TOTAL CONTRACT COST				539
SUPERVISION, INSPECTION AND OVERHEAD (5.5%)				30
TOTAL REQUEST				569
AREA COST FACTOR	1.05			
<p>10. DESCRIPTION OF PROPOSED CONSTRUCTION:</p> <p>All site preparation, drainage improvements, concrete slab foundation, brick veneer exterior surfaces over concrete block, with decorative interior finishings. Project provides offices, restrooms, counseling and meeting rooms, customer waiting area, computer equipment room, and interior and exterior child play areas. Includes all utilities, parking, landscaping and irrigation system. Air conditioning: 5 Tons</p> <p>11. REQUIREMENT: 5,000 SF ADEQUATE: 0 SUBSTANDARD: 3,500 SF</p> <p>PROJECT: Family Housing Management Facility (Current Mission)</p> <p>REQUIREMENT: An adequate facility is required for managing base owned/operated family housing assets, for assisting all arriving personnel in finding adequate on or off base housing, and for managing furnishings for authorized base personnel. The facility must be located for convenient access by arriving personnel and those ready assigned to base housing. It must be handicapped accessible and have adequate parking for vehicles pulling trailers, and small trucks which may be used by arriving personnel. The facility must provide office space, a conference room, private counseling rooms, administrative space, a reception and customer waiting area, a customer referral area with multiple telephones, a computer room and storage space for equipment and publications, a kitchen area for use by families, and interior and exterior play areas for children of customers. Exterior play areas must be provided with recreation equipment and be fenced for security. The facility exterior requires landscaping to enhance customer appeal.</p> <p>CURRENT SITUATION: PROVIDE A GOOD "WORD PICTURE" OF EXISTING CONDITIONS AND PROBLEMS. EXAMPLE: The current Housing Management function is located in a wood frame structure constructed as an open-bay, central latrine barracks in 1948. The facility has had little work done in the intervening 45 years to make it an adequate administrative facility. The facility does not have adequate space to accommodate housing management functions and furnishings management responsibilities. The results is an extremely crowded housing management office with some office functions dispersed in other buildings. The poor facility presents a very unfavorable impression</p>				

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1. COMPONENT AIR FORCE	FY 1996 MILITARY CONSTRUCTION PROJECT DATA		2. DATE
3. INSTALLATION AND LOCATION BLUE AIR FORCE BASE, NOWHERE			
4. PROJECT TITLE FAMILY HOUSING MANAGEMENT FACILITY		5. PROJECT NUMBER XRMM971993	
<p>and "welcome" to the thousands of customers who transit the facility each year. Facility layout are inadequate. The facility is located in the industrial portion of the base and is not convenient to users. The small building does not have the layout or space to provide necessary customer support. Counseling rooms are inadequate resulting in customer delays. Existing space affords little privacy to families in counseling. There is no interior play area for children to use while parents are being counseled on housing on housing opportunities requirements. Lack of storage space results in open storage of supplies and equipment in office and customer areas. Heating and air conditioning systems are unreliable and do not adequately support the facility. Age, and the environment have taken their toll on the structure. Floors are uneven, plumbing and electrical systems do not meet modern codes, and walls and ceilings are stained from water leakage. The facility will be demolished upon completion of this replacement project.</p> <p><u>IMPACT IF NOT PROVIDED:</u> Unusual and costly resource commitment will be necessary to keep the existing facility habitable. Major repair or improvements are not an option due to the age and condition of the facility and extensive investment required. Customers will continue to be served in the best possible fashion, albeit in an extremely cramped, deteriorated and unprofessional environment. Management and operations of housing functions will continue from multiple facilities which detracts from effectiveness of personnel and available for customers support.</p> <p><u>ADDITIONAL:</u> This project meets the criteria/scope specified in Part II of Military Handbook 1190, "Facility Planning and Design Guide".</p>			

Figure 1.7. Sample Deficiency Detail Data (DDD) - Support Facilities Project.

1. COMPONENT AIR FORCE	FY 1996 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
3. INSTALLATION AND LOCATION BLUE AIR FORCE BASE, EVERYWHERE		
4. PROJECT TITLE FAMILY HOUSING MANAGEMENT FACILITY		5. PROJECT NUMBER XRMM971993

Existing Facilities Deficiency Detail Data Sheet (EFDDDS)

1. Requirements and Assets:

(1) Scope of Request: Construct 6,400 SF

(2) Mission: One B-3 SQ with associated training functions; 2 KC-14 SQ; Two AFRES F-99 SQ; Survival Training for Aircrews. Base military population is 14,998.

(3) Requirement: (Show specific source of requirement or how scope was derived.) Total base requirement in the category code is xx,xxx SF per xxxxxxxxxxxxxx. AFI 32-8004 (formerly AFR 86-2) AND HQ XXX definitive specify xxx SF for a base supporting over x,xxx housing units.

(4) Functional Breakout of Proposed Project Scope:

a. Self-help storedisplay area	1,000 SF
b. Warehouse	3,000 SF
c. Office 2 PN	400 SF
d. Maintenance Shops	<u>2,000 SF</u>
	<u>6,400 SF</u>

(5) Requirements/Assets:

	SE	<u>No. of Bldgs</u>
a. Total requirement	6,500	2
b. Existing substandard	2,900	3
c. Existing adequate	0	-
d. Funded, not in inventory	100	1
e. Adequate assets (c + d)	100	1
f. Included in prior program	0	-
g. Deficiency (a-e-f)	6,400	1

2. Facility Summary: Category Code 219-944

<u>Nonmenclature</u>	<u>Bldg Nmr</u>	<u>Scope Used / Total</u>	<u>Yr/Code/Const</u>	<u>Remarks</u>
EXISTING SUBSTANDARD:				
Fam Hsg Maint	408	1,000/1,000	48 3 Wood	Demo this project
Fam Hsg Stor	842	1,000/1,000	57 3 Metal	Demo this project
FH Mnt Office	418	900/20,000	89 3* Mason	See Note
Note - Occupies portion of larger BCE Admin Facility. Space will revert to BCE admin functions (separate EFDDDS attached).				
* Real Property records show CC 1 for this facility. It is CC 3 for the FH Maint function due to location.				
ADEQUATE:				
FH Flam Stor	415	100/100	93 1 Mason	Under Const
DEFICIENCY:				
FH Maint/Stor	416	9,400/9,400	- - Mason	This Project

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Figure 1.8. Sample DD Form 1391, Improvement Project.

1. COMPONENT AIR FORCE	FY 1996 MILITARY CONSTRUCTION PROJECT DATA			2. DATE
3. INSTALLATION AND LOCATION BLUE AIR FORCE BASE, EVERYWHERE			4. PROJECT TITLE IMPROVE FAMILY HOUSING (PHASE 3)	
5. PROGRAM ELEMENT 8.87.42	6. CATEGORY CODE 711-111	7. PROJECT NUMBER XXXXX880002	8. PROJECT COST (\$000) 6.995	
9. COST ESTIMATES				
ITEM	U/M	QUANTITY	UNIT COST	COST (\$000)
IMPROVE FAMILY HOUSING (PHASE 3)	UN	100	56.000	56,000
SUPPORTING FACILITIES				830
PAVEMENTS	SY	10.000	3	(50)
UTILITIES	LS			(450)
LANDSCAPING	LS			(200)
RECREATION FACILITIES	LS			(50)
ASBESTOS/LEAD-BASED PAINT ABATEMENT	LS			(100)
SUBTOTAL				6,430
CONTINGENCY (5%)				322
TOTAL CONTRACT COST				6,752
SUPERVISION, INSPECTION AND OVERHEAD (3%)				203
TOTAL REQUEST				6,955
MOST EXPENSIVE UNIT	\$75,000			
AREA COST FACTOR	1.05			
<p>10. DESCRIPTION OF PROPOSED CONSTRUCTION:</p> <p>Provides general interior and exterior modernization and renovation of housing units. Includes utility upgrade and additions to meet current standards. Upgrades kitchens, bathrooms and floor coverings, improves floor plans, provides increased energy efficiency, privacy fencing, patios, playgrounds and recreation areas. Includes demolition and asbestos/Lead-Based Paint removal.</p> <p>11. REQUIREMENT: 1,000 UN ADEQUATE: 700 UN SUBSTANDARD: 300 UN</p> <p>PROJECT: Improve Military Family Housing (Phase 3). This phase includes work on one General Officer Quarters (Current Mission)</p> <p>REQUIREMENT: This project is required to provide modern and efficient housing for military members and their dependents stationed at Blue AFB. The housing must be upgraded to meet current life safety codes and to provide a comfortable and appealing living environment comparable to the off-base civilian community. This is the third of multiple phases to upgrade 500 houses. Two hundred units have been upgraded or are approved in previous phases, and 200 remain to be accomplished in subsequent phases. All units will meet "whole house" standards and are programmed in accordance with the Housing Community Plan, phase xx. Renovated housing will provide a modern kitchen, living room, family room, bedroom and bath configuration, with ample interior and exterior storage. Living units will be expanded to meet current space authorizations. Single car garages and off street parking will be provided where deficient. Neighborhood improvements are required and will include landscaping, playgrounds and recreation areas.</p> <p>CURRENT SITUATION: This project upgrades and modernizes housing which was constructed in 19xx. These xx year old houses require major renovation and repair to correct deterioration resulting from age and heavy use. They have had no major upgrades since construction, and do not meet the needs of today's families, nor do they provide a modern home environment. Kitchen and bathroom cabinets and fixtures are obsolete and deteriorated. Counter tops are warped, stained, and separating at the seams. Plumbing and lighting fixtures are deteriorated and dated. The electrical</p>				

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1. COMPONENT AIR FORCE	FY 1996 MILITARY CONSTRUCTION PROJECT DATA		2. DATE
3. INSTALLATION AND LOCATION BLUE AIR FORCE BASE, EVERYWHERE			
4. PROJECT TITLE IMPROVE FAMILY HOUSING (PHASE 3)		5. PROJECT NUMBER XXXX880002	
<p>systems do not meet modern construction codes. Ground Fault Circuit Interrupter protection is not provided for bathrooms, kitchens, and exterior circuits. Flooring is stained, loose, and mismatched due to non availability of original materials for replacement. Windows, siding, and insulation require replacement. The units have inadequate living space and storage, and no patio or backyard privacy. Landscaping and recreation areas for housing residents are deficient. Pavements areas need renovation.</p> <p><u>IMPACT IF NOT PROVIDED:</u> Units will continue to deteriorate rapidly, resulting in increasing operations, maintenance and repair costs to the Government and inconvenience to residents. Without this project repair of these units will continue in a costly, piecemeal fashion with little or no improvement in living quality. Low morale and retention can be expected if such conditions are permitted to continue. Suitable, affordable off-base housing is not available. The most recent Housing Market Analysis shows an on-base housing deficit of xxx units.</p> <p><u>WORK ACCOMPLISHED IN PREVIOUS THREE YEARS:</u> None.</p> <p><u>WORK PROGRAMMED FOR NEXT THREE YEARS:</u> None.</p> <p><u>ADDITIONAL:</u> An economic analysis has been prepared comparing the alternatives of new construction, improvement, and status quo operation. Based on the net present values and benefits of the respective alternatives, improvement was found to be the most cost effective over the life of the project. The cost to improve this housing is xx% of the replacement cost.</p>			
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Figure 1.9. Sample Maintenance & Repair Project.

1. COMPONENT AIR FORCE	FY 1996 MILITARY CONSTRUCTION PROJECT DATA			2. DATE
3. INSTALLATION AND LOCATION BLUE AIR FORCE BASE, NEW HAMPSHIRE			4. PROJECT TITLE REPLACE KITCHEN CABINETS AND COUNTERTOPS	
5. PROGRAM ELEMENT 8.87.46	6. CATEGORY CODE 711-111	7. PROJECT NUMBER XXXX880004	8. PROJECT COST (\$000) 3.033	
9. COST ESTIMATES				
ITEM	U/M	QUANTITY	UNIT COST	COST (\$000)
REPLACE KITCHEN CABINETS AND COUNTERTOPS	LS			2.805
PHASE I (FY96)	UN	200	2.600	(520)
PHASE II (FY97)	UN	300	2.800	(840)
PHASE III (FY98)	UN	250	3.100	(775)
PHASE IV (FY99)	UN	150	3.400	(510)
MINOR ALTERATIONS	UN	200	800	(160)
SUBTOTAL				2.805
CONTINGENCY (5%)				140
TOTAL CONTRACT COST				2.945
SUPERVISION, INSPECTION AND OVERHEAD (3%)				88
TOTAL REQUEST				3.033
AREA COST FACTOR	1.00			
<p>10. DESCRIPTION OF PROPOSED CONSTRUCTION</p> <p>Replace existing counter tops and metal cabinets with new laminated plastic counter tops and wood cabinets in 900 Capehart units. Replace sinks. Reroute plumbing under sinks. Paint and patch walls and ceilings. Reconfigure the kitchen layout for 200 units.</p> <p>11. REQUIREMENT: 1 600 UN ADEQUATE: 700 UN SUBSTANDARD: 900 UN</p> <p>PROJECT: Provides for replacement of deteriorated kitchen counter tops, cabinets, plumbing, and installation of dishwashers and disposers.</p> <p>REQUIREMENT: Project is required to provide adequate kitchen facilities and prevent damage to interior walls and cabinets due to frozen pipes.</p> <p>CURRENT SITUATION: This kitchen cabinets and counter tops were installed during the original construction of these units 23 years ago and have deteriorated beyond repair. A unit by unit survey reveals that the metal kitchen cabinets are stained, warped, dented, and do not close properly. The counter tops are peeled, scratched and chipped. The existing piping is located in the exterior walls and is subject to freezing in sub-zero temperatures, resulting in leaks and water damage to the cabinets and walls, and great inconvenience to the occupants. One third of the units experience freeze damage every winter. All but 200 units had dishwashers and disposals installed in the 1970's. These units are scheduled for accomplishment in the first phase so that the dishwashers and disposers may be installed in conjunction with replacement of the cabinets.</p> <p>ADDITIONAL: These units are not scheduled for major repair or improvement work in the future. Occupants have identified the kitchen cabinets and counter tops as their only major dissatisfaction with these units. The cost to repair these units is xx% of the replacement costs.</p>				
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Figure 1.10. Sample Restoration Project.

1. COMPONENT AIR FORCE		FY 1996 MILITARY CONSTRUCTION PROJECT DATA		2. DATE	
3. INSTALLATION AND LOCATION BLUE AIR FORCE BASE, CALIFORNIA			4. PROJECT TITLE RESTORATION OF FIRE DAMAGE		
5. PROGRAM ELEMENT 8.87.42	6. CATEGORY CODE 711-111	7. PROJECT NUMBER XXXX880005		8. PROJECT COST (\$000) 65	
9. COST ESTIMATES					
ITEM	U/M	QUANTITY	UNIT COST	COST (\$000)	
RESTORATION OF FIRE DAMAGE	LS			60	
RESTORATION	LS			(45)	
IMPROVEMENT	LS			(15)	
SUBTOTAL				60	
CONTINGENCY (5%)				3	
TOTAL CONTRACT COST				63	
SUPERVISION, INSPECTION AND OVERHEAD (3%)				2	
TOTAL REQUEST				65	
AREA COST FACTOR	1.20				
10. DESCRIPTION OF PROPOSED CONSTRUCTION:					
Remove debris; provide chemical or mechanical deodorization; reconstruct portions of roof, wall and floor areas, replace burned electrical and heat systems, paint interior. Reconfigure kitchen area and provide landscape. Facility number 1003.					
11. REQUIREMENT: 1,200 UN ADEQUATE: 900 UN SUBSTANDARD: 300 UN					
<p>PROJECT: Provides for restoration of a 3-bedroom company grade Capehart unit which was damaged by fire.</p> <p>REQUIREMENT: Project is required to restore the unit to a livable condition. The unit will remain vacant until the repairs are accomplished.</p> <p>CURRENT SITUATION: This unit was damaged by fire on 17 October 1996. The furnace heat stack was disconnected, causing wood framing above the furnace fire box to ignite. A survey has since been made to determine if there are similar furnace stacks that need to be reconnected or replaced.</p> <p>ADDITIONAL: The current occupancy rate at Blue AFB is 98.9 percent. There are a total of 250 families on the waiting list, with 7 families waiting for this type of unit. The average waiting time is 4 to 6 months. The estimated replacement cost for this type of unit is \$108,000. This project represents 60 percent of the replacement cost of an individual unit. An economic analysis has been performed comparing the alternatives of new construction and repair. Based on the net present values and benefits of the respective alternatives, repair was found to be the most cost effective over the life of the project. No personnel injuries were suffered. A smoke detector was present and did activate. The occupants were not held liable for the damage.</p>					
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Chapter 2

DESIGN CRITERIA

2.1. Design Standards. Family housing designs must follow statutory limitations, concepts in the housing community plan, and the *Air Force Family Housing Guide* regardless of the funding source. Design and construction must also conform to local, national, and federal building codes.

2.2. Whole-Neighborhood Design Criteria. Bases develop whole-neighborhood designs to improve family housing neighborhoods by:

- Improving homes using whole-house revitalization guidelines.
- Creating a sense of neighborhood identity for each family.
- Ensuring that the housing area meets the needs of its occupants.
- Making the housing area attractive and a source of pride.

2.3. Whole-House Design Criteria. Bases develop whole-house designs to enhance functional layout, systems, and equipment in housing units and support facilities. The design work updates an existing house to current construction codes and contemporary quality living standards, and extends the useful life of the housing unit 25 years. Whole-house designs typically include:

- Adding and altering space.
- Upgrading mechanical, electrical, and utilities systems.
- Adding energy conservation features.
- Repairing building structure, components and equipment
- Improving yards, walks and driveways.

2.3.1. Requirements. The *Air Force Family Housing Guide* details requirements for whole-house design. It addresses:

- Functional layout and basic amenities.
- Minimum floor areas.
- Room dimensions.
- Energy criteria.
- Environmental issues.

2.3.2. Handicapped Criteria. The *Air Force Family Housing Guide*, *Uniform Federal Accessibility Standards* and *DoD Military Handbook 1190* provide handicapped design criteria for family housing. Each base insure 5 percent of its family housing inventory is handicap adaptable.

2.3.3. Fire-Safety Criteria. The *Air Force Family Housing Guide*, *DoD Military Handbook 1190* and *Military Handbook 1035* outline the requirements for installing fire sprinkler systems, smoke detectors, and kitchen range hoods.

2.3.4. Environmental Remediation Criteria. The *Air Force Family Housing Guide* provides guidance for:

- Handling and removing asbestos containing materials.
- Preventing the entry of radon gas.
- Assessing, managing, and abating lead-based paint in all housing.

2.3.5. Energy Design Criteria. MAJCOMs consider using renewable forms of energy in all family housing projects. See the *Air Force Family Housing Guide* for the procedures and strategies for energy conservation.

2.3.5.1. MAJCOMs and bases use energy conservation methods and cost effective techniques to design new and replacement construction and improvement projects. Use:

- Renewable energy sources (particularly passive or active solar energy systems).
- High efficiency equipment, lighting, and appliances with appropriate controls.
- Increased insulation in floors, walls, ceilings and roofs.
- Radiant barriers.
- Energy efficient windows and doors with insulated or Low-E glass and panels, double or triple glazing, thermal breaks, and weather-stripping.
- Air lock entries on exterior doors where winter temperatures drop to -10 degrees Fahrenheit (-23 degrees Celsius) or lower.
- Window shading to reduce interior overheating caused by solar gain.

2.3.6. Prohibited Materials, Finishes and Equipment. The *Air Force Family Housing Guide* lists prohibited building materials, finishes, and equipment based on considerations such as maintenance, fire safety, environmental restrictions, and energy efficiency.

2.3.7. Electrical and Mechanical Design Criteria. Design agents follow the *Air Force Family Housing Guide* and applicable codes to determine the electrical and mechanical design requirements.

2.3.8. Sound Attenuation. Family housing improvement and construction must provide minimum noise level reduction of 20 percent.

2.3.8.1. MAJCOMs must review the Air Installation Compatible Use Zone report for each project to ensure that adequate sound attenuation is incorporated into the design of family housing units.

2.4. Housing Support Facilities. MAJCOMs follow the guidelines in the *Housing Support Facilities Design Guide* to plan and design housing management offices, housing maintenance facilities and storage warehouses.

Chapter 3

DESIGN MANAGEMENT AND PROJECT EXECUTION

3.1. Project Execution. MAJCOMs and bases, for each new construction, improvement and major maintenance and repair project:

- Must comply with the housing community plan.
- Develop whole-house and whole-neighborhood projects together.

3.1.1. When HQ USAF/CEH issues a 100 percent design instruction, architect-engineers begin the design phase. The design phase ends when a construction contract is awarded.

3.1.1.1. The design manager:

- Selects architect-engineers according to AFI 32-1023, *Design and Construction Standards and Execution of Facility Construction Projects*, Chapter 3.
- Designs to satisfy project requirements and deliver the highest quality project within the program's budget.
- Awards architect-engineer contracts by October of the programmed FY minus 2 years.
- Completes designs by June of the programmed FY minus 1 year.
- Completes the Environmental Impact Analysis Process by October of the programmed FY minus 2 years.
- Awards construction contracts 1 month after Air Force receives annual appropriation.

3.1.1.2. MAJCOMs may convert an improvement project to a replacement construction project during the design phase (see paragraph 1.11.3).

3.2. Project Delivery Methods. The traditional design-bid-build delivery method requires an invitation for bid while the non-traditional, turnkey and design-build delivery methods require a request for proposal.

3.2.1. HQ USAF/CE must approve use of turnkey and design-build, delivery methods for all family housing projects.

3.2.2. See AFR 70-30, *Streamlined Source Selection Procedures*, for procedures and guidance for procuring turnkey family housing projects.

3.3. Design Funds:

3.3.1. HQ USAF/CEH issues bulk design (P-714) funds to the MAJCOMs each year.

3.3.2. MAJCOMs manage design funds and keep track of design costs for each project.

3.3.2.1. Use design (P-714) funds for:

- Paying architect-engineer services and installation level in-house costs when investigating project sites.
- Preparing contract drawings and specifications, request for proposals and housing community plans.

3.3.2.2. Use family housing maintenance and repair (P-722) funds, not design (P-714) funds, for:

- Feasibility studies.
- Economic and market analyses.
- Preparing as-built drawings and alternative site studies.
- Preparing environmental impact assessments and statements or developing and justifying construction project requirements, not project specific.
- Design of maintenance and repair projects.
- Administrative or management costs during the source selection process for turnkey or design-build projects.

3.3.3. MAJCOMs and bases must use housing community plan design concepts to develop the final technical design of the construction project or the request for proposal.

3.3.4. 10 U.S.C., 2807 requires the Air Force notify the Congress 21 calendar days before obligation of funds for architect-engineer design contracts over \$300,000. Title 10 U.S.C. 9540 (b) limits to 6 percent of the programmed amount the portion of the architect-engineer fee for producing plans and specifications for a family housing project.

3.4. Programming, Design, and Construction Execution Reporting:

3.4.1. MAJCOMs report to HQ USAF/CEH the design and construction status of all family housing projects through programming, design and construction in a timely manner.

3.4.2. The MAJCOM reviews, validates, and updates programming, design and construction.

3.4.3. HQ USAF/CEH:

- Uses programming, design and construction data to oversee the Air Force family housing program.
- Issues authority to advertise when project design is reported 100 percent in programming, design and construction.
- Issues construction funds based on a validated programming, design and construction bid reports from the MAJCOMs.

3.4.4. For definitions of programming, design and construction design status, see Construction Technical Letter 90-2.

3.5. Design Authority:

3.5.1. HQ USAF/CEH:

- Issues a 100 percent design instructions on all family housing projects by 30 June of each FY.
- Delegates 3 percent design authority to MAJCOMs.

3.5.2. MAJCOMs use the 3 percent standing design authority to negotiate architect-engineer design contracts for family housing projects.

Chapter 4

CONSTRUCTION MANAGEMENT

4.1. Construction Management. Construction agents prepare a comprehensive management plan to define roles and responsibilities for all agents in the construction management process. The plan also provides a mechanism for resolving conflicts and serves as a tool for managing and controlling schedules.

4.2. Cost Control. MAJCOMs:

- Must avoid reprogramming projects if at all possible.
- Submit a cost control management plan to HQ USAF/CEH when a project exceeds 115 percent of programmed amount.

4.3. Cost / Scope Variation and Reprogramming:

4.3.1. HQ USAF/CEH reprograms in accordance with 10 U.S.C. 2853, family housing projects when unforeseen conditions arise during construction.

4.3.2. MAJCOM Civil Engineers submit a written justification for reprogramming that includes:

- Current working estimates based on validated bids or proposals, including bid extensions.
- Economic analysis, if required, to justify an upward adjustment of high unit cost.
- Impact of terminating the contract.
- Revised DD Form 1391.
- Justification for reprogramming.

4.3.3. HQ USAF/CEH approves cost increases less than 25 percent of programmed amount or less than \$2,000,000, whichever is less.

4.3.4. The Congress approves:

- Cost increases greater than 25 percent of programmed amount or greater than \$2,000,000.
- Any scope increase or reduction greater than 25 percent.

4.3.5. SAF/MII approves scope increase or reduction 25 percent or less.

4.3.6. The Air Force must notify the Congress in a cost variation package when scope reduction results in costs that exceed the high cost unit.

4.3.7. MAJCOMs and bases may exclude costs associated with unforeseen legislated environmental hazard remediation such as removing asbestos, mitigating radon, or abating or removing lead-based paint from reprogramming thresholds to avoid disruption or delay of ongoing construction contracts.

4.3.8. MAJCOMs and bases:

- Include documentation of the environmental exclusion in the project file.
- Provide HQ USAF/CEH with an after-the-fact notice that gives information about work scope, cost break-out, and other pertinent environmental remediation work details.
- Submit notices at the end of March and September each year to HQ USAF/CEH.

4.3.9. SAF/MII submits after-the-fact notices to the Congress semiannually.

4.4. Schedule. MAJCOMs and bases prevent any family housing project from falling 5 percent or more behind approved schedule.

4.5. Prototype Units. The base constructs a prototype unit for each type of housing facility in the project to aid construction inspection and acceptance.

4.6. Inspection Policy. Each family housing construction project, with a contract cost of \$1,000,000 or more, must have at least one full-time inspector assigned. The inspector:

- Ensures a quality product is delivered on time and in accordance with the terms of the contract.
- May not accept any family housing units without a prefinal and final inspection.
- Must complete all punch list items before final acceptance.

4.7. Fiscal Closeout:

4.7.1. MAJCOMs closeout a project within 4 months after completion, regardless of any pending claims.

4.7.2. SAF/FMB and HQ USAF/CEH withdraw any surplus funds.

4.7.3. HQ USAF/CEH reopens the account for any project if a claim warrants funding.

4.8. Architect-Engineer Liability. MAJCOMs pursue architect-engineer liability for design deficiencies when they result from:

- Errors or omissions in design or construction.
- Failure to meet standards.
- Breaches in contracts that damage the Government.
- Additional contractor contract cost.

JAMES E. McCARTHY, Maj General, USAF
The Civil Engineer

Attachment 1

GLOSSARY OF REFERENCES AND TERMS

References

AFI 32-1032, *Planning and Programming of Real Property Maintenance Projects*

AFI 32-6001, *Housing Management*

AFI 32-6003, *General Officer Quarters*

AFI 32-6004, *Furnishings Management*

AFI 32-6005, *Unaccompanied Housing Management and Operations*

AFI 32-7001, *Environmental Budgeting*

AFI 32-7061, *Environmental Impact Analysis Process*

AFI 32-7062, *Base Comprehensive Planning*

AFI 32-7065, *Cultural Resources Management*

AFI 32-7080, *Pollution Prevention Program*

AFI 32-1021, *Planning and Programming of Facility Construction projects*

AFI 32-1022, *Planning and Programming of Nonappropriated Fund Facility Construction Projects*

AFI 32-1023, *Design and Construction Standards and Execution of Facility Construction Projects*

AFI 32-1024, *Standard Facility Requirements*

AFI 32-9004, *Disposal of Real Property*

AFI 65-501, *Economic Analysis and Program Evaluation for Resource Management*

AFI 65-601, Volume 4, *Appropriation Symbols and Budget Codes*

AFI 65-601, Volume 5, *US Air Force Budget Investment Appropriation*

AFI 65-603, *Official Representation Funds*

AFM 88-29, *Engineering Weather Data*, July 1, 1978

AFPD 32-1, *Air Force Installations and facilities*

AFPD 32-6, *Housing*, July 9, 1993

AFPD 32-7, *Environmental Planning*, November 1993

AFPD 65-5, *Cost and Economics*, May 1993

AFPD 65-6, *Budget*, December 1993

Air Force Family Housing Guide

Air Force Housing Economic Analysis Guidance Manual, February 1994

Air Force Housing Market Analysis Guidance Manual, October 1993

Air Force Housing Support Facilities Guide

DoD Directive 4270.36, *DoD Emergency, Contingency, and Other Unprogrammed Construction*, May 16, 1991

DoD Manual 4165.63-M, *DoD Housing Management*, September 1993

DoD Regulation 7000.14-R, Volume 2, *DoD Financial Management Regulation*, June 1993

Military Handbook-1190, *Military Handbook/Facility Planning and Design Guide*, September 1, 1987

SAFO 700.8, *Delegation of Authority to Approve Cost Variations in Construction Projects Pursuant to 10 U.S.C. 2853*, October 15, 1991

SAFO 700.17, *Delegation of Authority to Approve Restoration or Replacement of Damaged or Destroyed Facilities Pursuant to 10 U.S.C. 2854*, April 20, 1992

SAFO 700.51, *Delegation of Authority to Approve Relocation of Military Family Housing Units Pursuant to 10 U.S.C. 2827*, September 18, 1991

SAFO 700.52, *Delegation of Authority to Approve Leases of Military Family Housing Pursuant to 10 U.S.C. 2828*, August 3, 1992

Title 10 U.S.C. 2571, *Interchange of Property and Services*, December 3, 1985

Title 10 U.S.C. 2667, *Lease: non-excess Property*, October 23, 1992

Title 10 U.S.C. 2821, *Requirement for Authorization of Appropriations for Construction and Acquisition of Military Family Housing*, November 29, 1989

Title 10 U.S.C. 2822, *Requirement for Authorization of Number of Family Housing Units*, October 23, 1992

Title 10 U.S.C. 2823, *Determination of Availability of Suitable Alternative Housing for Acquisition in lieu of Construction of New Family Housing*, July 12, 1982

Title 10 U.S.C. 2824, *Authorization for Acquisition of Existing Family Housing in lieu of Construction*, July 12, 1982

Title 10 U.S.C. 2825, *Improvements to Family Housing Units*, October 23, 1992

Title 10 U.S.C. 2826, *Limitations on Space by Pay Grade*, December 5, 1991

Title 10 U.S.C. 2827, *Relocation of Military Family Housing Units*, July 12, 1982

Title 10 U.S.C. 2828, *Leasing of Military Family Housing*, December 5, 1991

Title 10 U.S.C. 2833, *Family Housing Support*, December 3, 1985

Title 10 U.S.C. 2834, *Participation in Department of State Housing Pools*, November 5, 1990

Title 10 U.S.C. 2835, *Long-term Leasing of Military Family Housing to be Constructed*, December 5, 1991

Title 10 U.S.C. 2836, *Military Housing Rental Guarantee Program*, December 5, 1991

Title 10 U.S.C. 2853, *Authorized Cost Variations*, November 29, 1989

Title 10 U.S.C. 2854, *Restoration or Replacement of Damaged or Destroyed Facilities*, December 5, 1991

Title 10 U.S.C. 9540, *Architectural and Engineering Services*, December 12, 1980

Terms

Change of Occupancy Work—Minor maintenance and repair work done on housing units when occupancy changes. Includes interior painting; repairing floors, walls, and ceiling finishes; and repairing electrical and plumbing fixtures. Doesn't include other maintenance or repair work, which may have been deferred until change of occupancy to avoid inconveniencing the occupants.

General Officer Quarters—A housing unit, including all grounds, walks, driveways, other paved areas, and structures designated for the exclusive use of general officers, their families or guests.

Historic Housing Facilities—Facilities currently on, or eligible for nomination to, the National Register of Historic Places; or facilities that figure significantly in state or local history.

Housing Area—An identifiable grouping of family housing facilities planned, developed, and maintained in a residential character.

Housing Community Plan—A long range planning and programming document, consistent with land use as defined in the base comprehensive plan, which maps out development of the entire housing area to incorporate whole-house and whole-neighborhood concepts, including:

- Developing elements of neighborhood vehicular and pedestrian circulation based on siting, density, landscaping, parking, playgrounds, recreation areas, and utilities.
- Reconfiguring floor layouts, if necessary, to make housing more functional, livable and accessible.
- Extending the life of a unit for another 25 years by adding, expanding, or converting space.

Housing (Dwelling) Unit—A single structure or part of a multiple-family building including:

- Carport, garage, driveway, or other associated parking.
- Patio.
- Privacy fence.
- Utility service lines.
- Other attached facilities.

Housing Market Analysis—A formalized method used to estimate current and projected housing deficits or surpluses at any given installation. Professionals trained in social sciences and familiar with principal data sources and analysis techniques conduct these analyses working as independent consultants. They justify the need for the Air Force to acquire or construct new family housing units, replace existing family housing units, or undertake whole-house or whole-neighborhood improvement projects.

Major Maintenance and Repair—Work necessary fix or replace systems and their components nearing the end of their useful lives. Bases generally contract out for this work. Work includes:

- Restoring or replacing components of facilities damaged by fire, storm, or other disaster.
- Restoring or replacing equipment (over 1 HP), utility systems or plants.
- Restoring or replacing structural members in their original locations, foundations, roofs, exterior structures or walls, interior partitions, electrical, plumbing, heating, ventilation and air conditioning, real property installed equipment.

- Any work where the cost of materials and labor exceed \$2500.
- Addition of insulation where either no insulation or inadequate insulation exists.
- Installation of carpet, vinyl wall coverings, and wall paneling in existing facilities (when the flooring requires repair).
- Complete painting of the exterior, landscaping, and planting of trees or shrubs.
- An upgrade to contemporary standards may be considered major maintenance and repair if:
- The work is consistent with projected facility life, utilization, and sound engineering practices.
- The upgrade would provide a better product and/or complete economically with the existing product. An engineering analysis will be performed.

Minor Maintenance and Repair—The day-to-day maintenance and repair work performed in response to service calls or urgent job orders accomplished by contract or in-house forces.

Net Floor Area—The floor space area (in square feet) inside the exterior walls and party walls of a structure, excluding:

- The floor area of an unfinished basement.
- An unfinished attic.
- A utility space.
- A garage or carport
- An open or insect-screened porch.
- A stairwell.
- Any space used exclusively for a solar energy system.

Non-dwelling Unit (Support Facilities)—Facilities directly associated with a housing area or facilities outside the housing area that solely support family housing. Examples include:

- Roads, common-use parking areas, and bus shelters.
- Playgrounds and walks.
- Utility systems.
- Family housing management offices and maintenance shops.

Program Amount—The total project cost, including construction, contingencies, supervision, inspection, and overhead.

Replacement Cost—The cost to replace an existing family housing unit built to authorized size and whole-house standards. MAJCOMs and bases estimate the unit cost together with the cost to replace supporting facilities using DoD Tri-Service Cost Model. Calculate unit cost per net square foot according to the DoD pricing guide, multiply this by authorized net square feet and adjust the total by area cost factor, project size, and unit size. For supporting facilities, calculate cost based on a specifically proposed site, using engineering cost estimates for:

- Site preparations.
- Road and pavement.

- Utilities.
- Landscaping.
- Recreation.
- Any other features such as demolition or environmental hazard remediation.

Security Improvements--Appropriations (3400 Funds - Base O&M)—Improvement work incorporating the latest Air Force Office of Special Investigation validated anti-terrorism features and physical security measures. These may include alarms, security lighting, physical barriers (fences), or safe rooms.

Statutory Space Limit—The limit on net floor areas based on numbers of bedrooms and rank. For maximum net floor areas, see paragraph 1.3.7.

Substandard Housing—Inadequate family housing designated as such, by the Congress in 1973 because of condition. Occupants in substandard housing forfeit only 75 percent of their basic allowance for quarters and variable housing allowances.

Surplus Housing—Housing no longer needed to support that base's family housing requirements as determined by the housing market analysis .

APPENDIX NO. 6

FIRE FLOW DATA

Dyess AFB Residential Housing Area: 2002 Flow Test Data

Location	Flow Hyd	Test Hyd	Size	Stat. Pres	Res. Pres	Coeff./ Pitot	GPM
126 Texas Dr.	12 3	12 4	2.5	72	50	.9/30	920
210 Texas Dr	12 10	12 9	2.5	72	52	.9/30	920
132 Alabama	12 14	12 15	2.5	72	44	.9/31	935
212 Alabama	12 16	12 17	2.5	74	41	.9/31	935
128 California	12 23	12 22	2.5	72	48	.9/32	950
208 California	12 26	12 25	2.5	70	44	.9/32	950
314 Louisiana	12 26	12 27	2.5	69	45	.9/34	978
110 Delaware	12 30	12 29	2.5	72	45	.9/35	993
110 Florida	12 34	12 35	2.5	71	45	.9/37	1020
114 Illinois	12 39	12 40	2.5	67	41	.9/34	978
114 Kansas	12 41	12 42	2.5	67	43	.9/30	920
249 Louisiana	12 44	12 45	2.5	66	42	.9/32	950
101 Rhode Island	13 3	13 2	2.5	70	45	.9/31	935
306 Texas Dr	13 9	13 8	2.5	71	43	.9/31	935
109 Utah	13 11	13 10	2.5	70	41	.9/30	920
107 Washington	13 12	13 14	2.5	69	43	.9/34	978
105 Arizona	13 17	13 16	2.5	71	47	.9/28	888
115 Colorado	13 19	13 20	2.5	70	45	.9/35	993
103 Indiana	13 25	13 24	2.5	71	44	.9/35	993
123 Maryland	13 30	13 31	2.5	69	42	.9/29	904
125 New York	13 37	13 36	2.5	68	38	.9/29	904
121 Oklahoma	13 40	13 41	2.5	68	39	.9/30	920
123 Pennsylvania	13 46	13 45	2.5	67	39	.9/30	920
123 Tennessee	13 49	13 50	2.5	66	40	.9/25	839
408 Michigan Ct	402 Mich.	13 65	2.5	65	38	.8/20	667
316 Ohio Ct	168 Wash.	13 67	2.5	64	36	.8/20	667
106 Wyoming Ct	202 Virg.	13 70	2.5	64	37	.8/25	746

● = within FY03 Project Site

APPENDIX NO. 7

**SAMPLE FLOOR PLANS,
ELEVATIONS AND SITE LAYOUT**

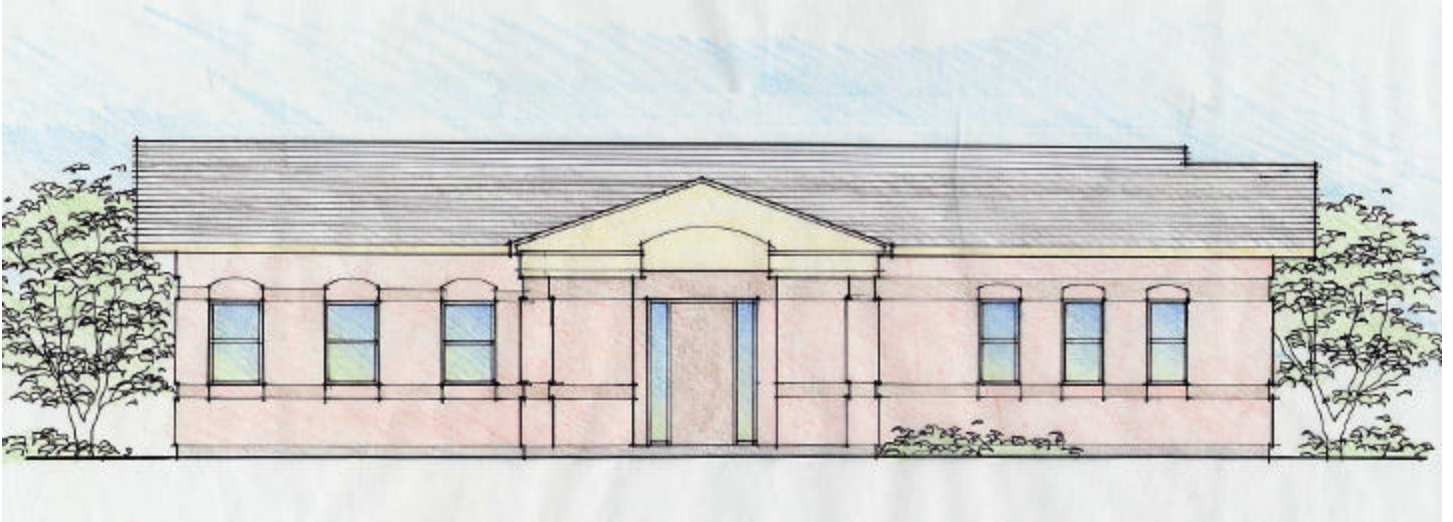


FIGURE 1: 3 BR Unit – Elevation “A”

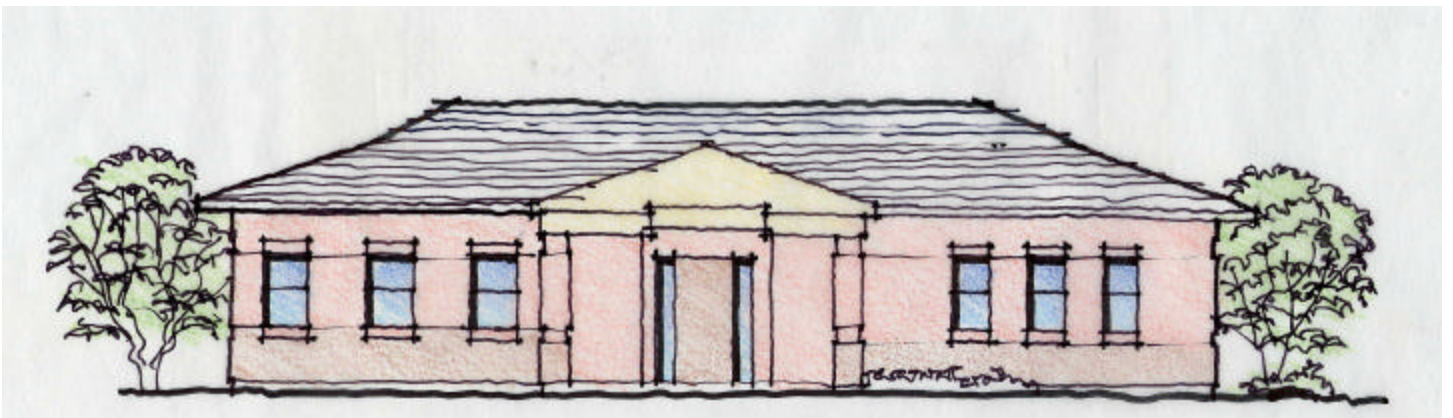


FIGURE 2: 3 BR Unit – Elevation “B”

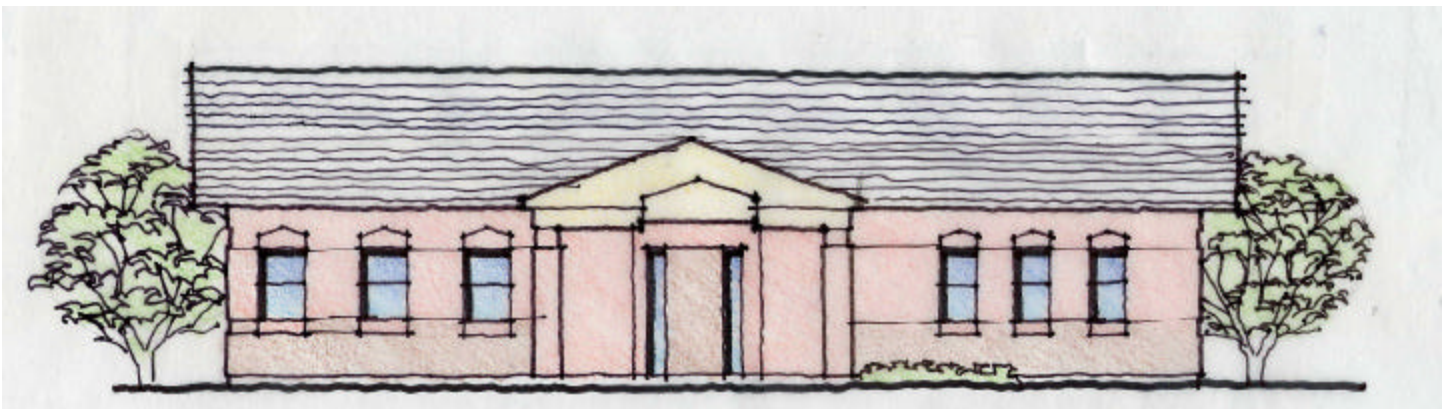


FIGURE 3: 3 BR Unit – Elevation “C”

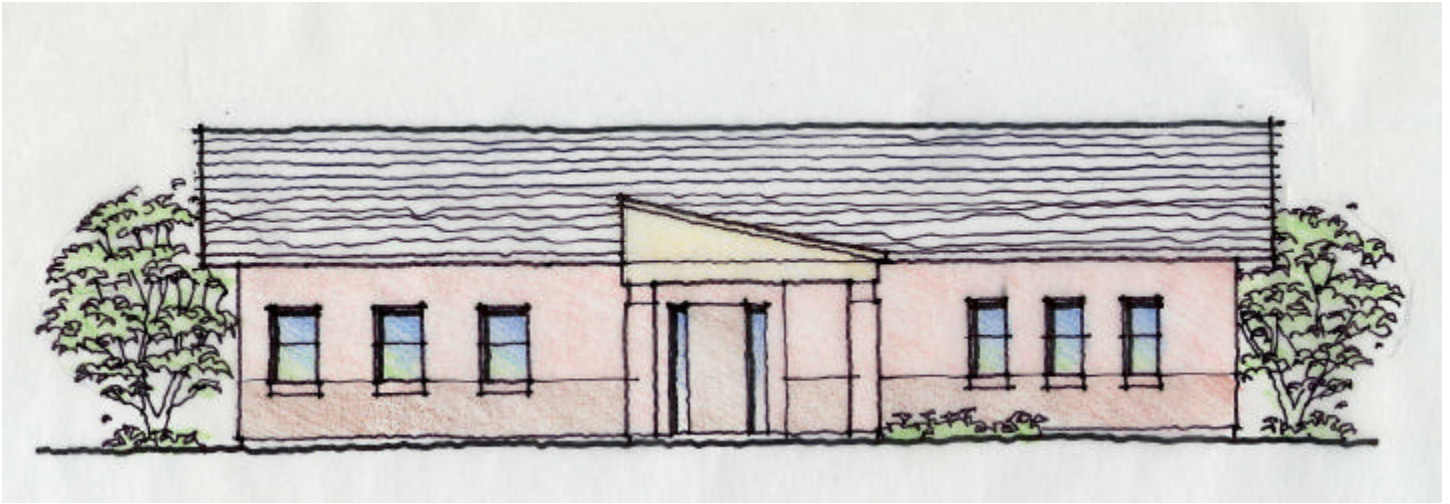


FIGURE 4: 3 BR Unit – Elevation “D”

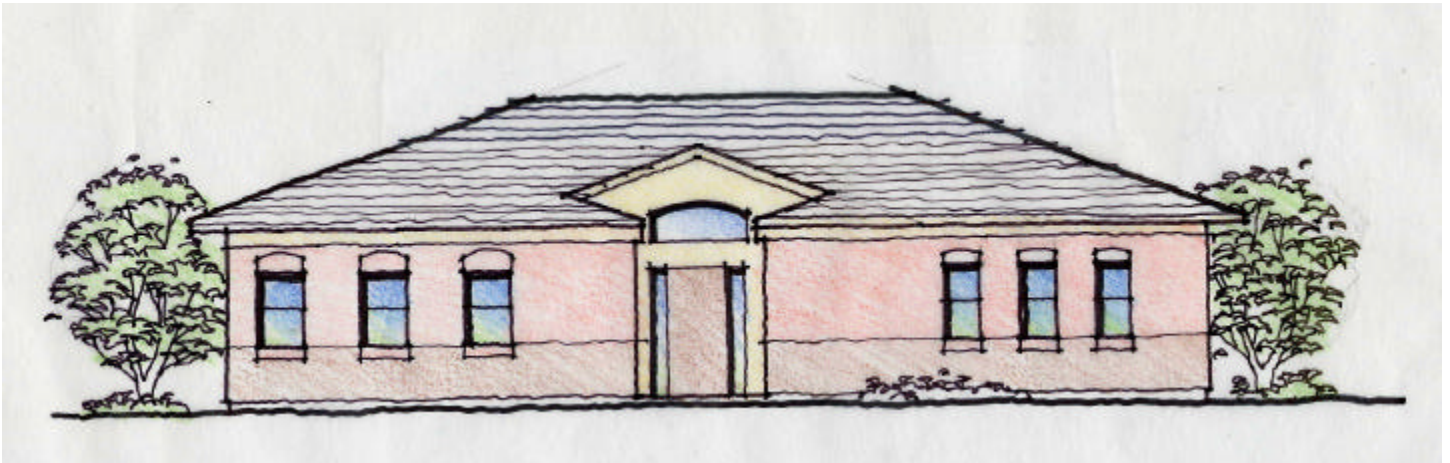


FIGURE 5: 3 BR Unit – Elevation “E”

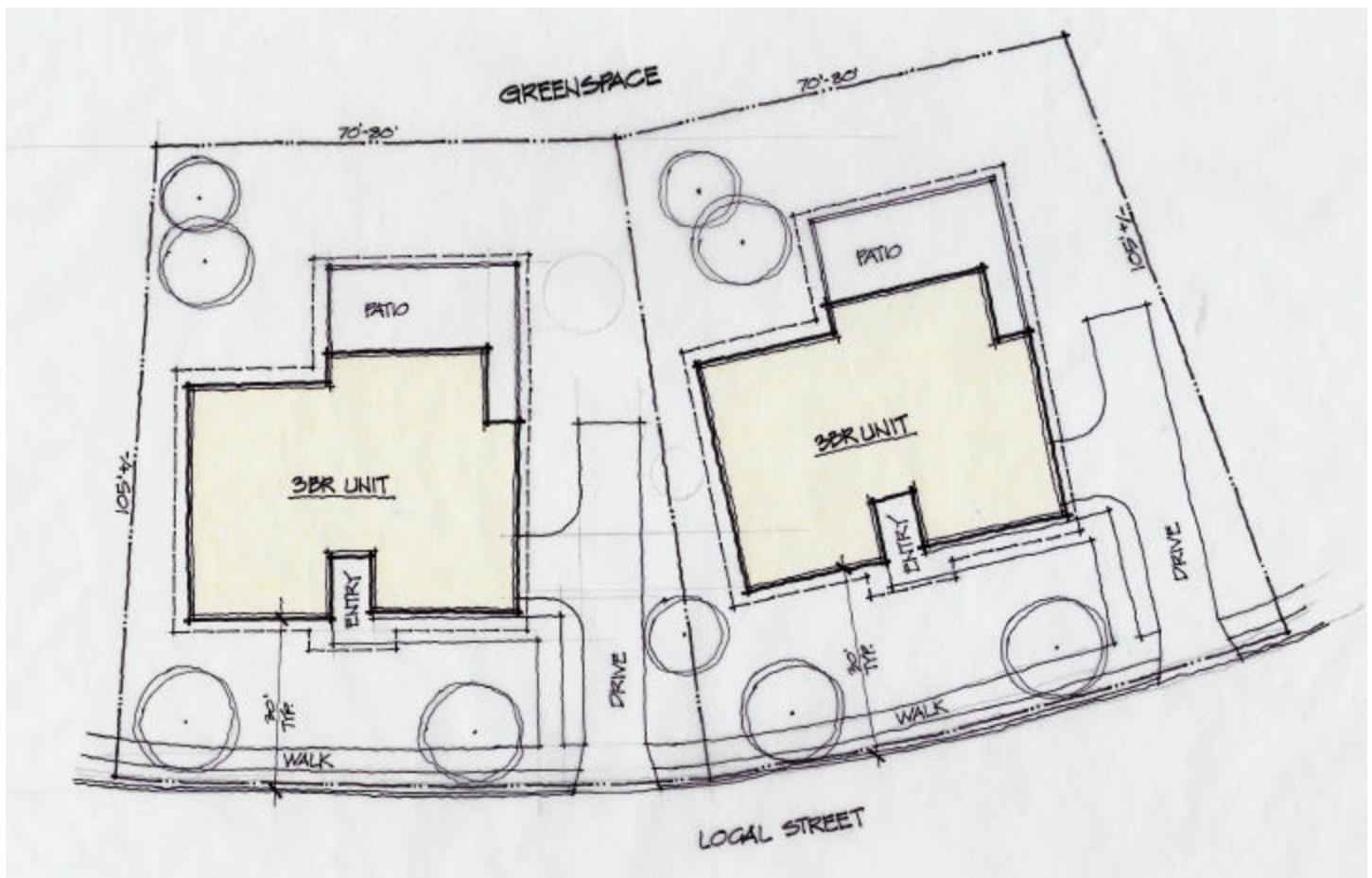


FIGURE 6: 3 BR Unit – Typical Site Plan

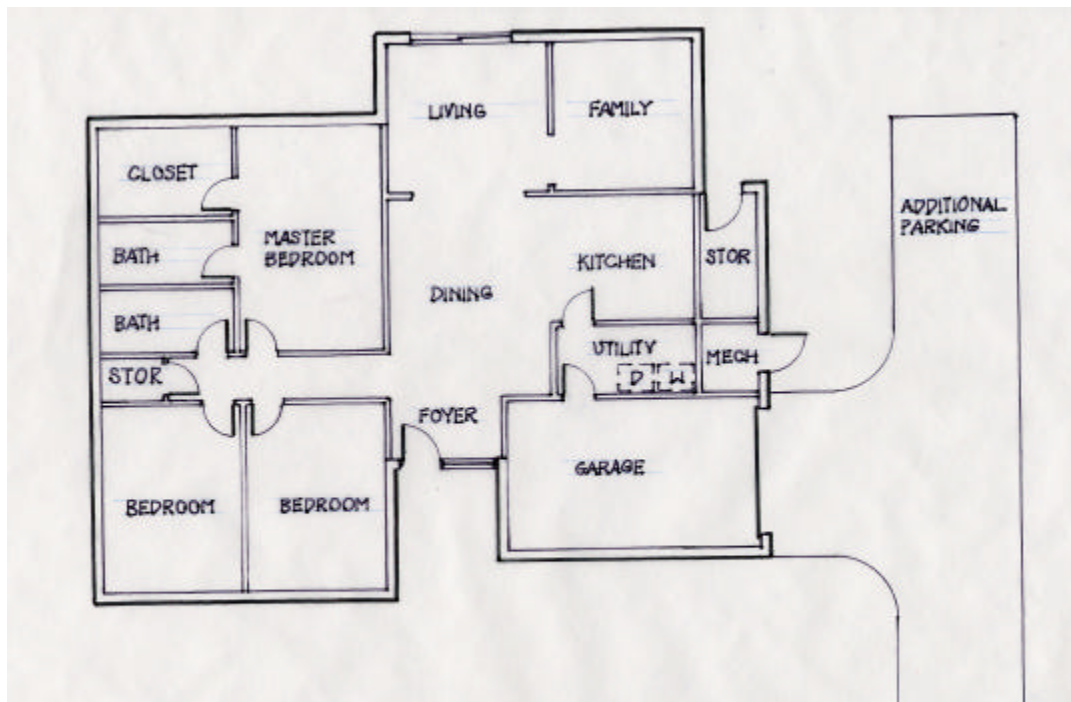


FIGURE 7: 3 BR Unit – Floor Plan Diagram

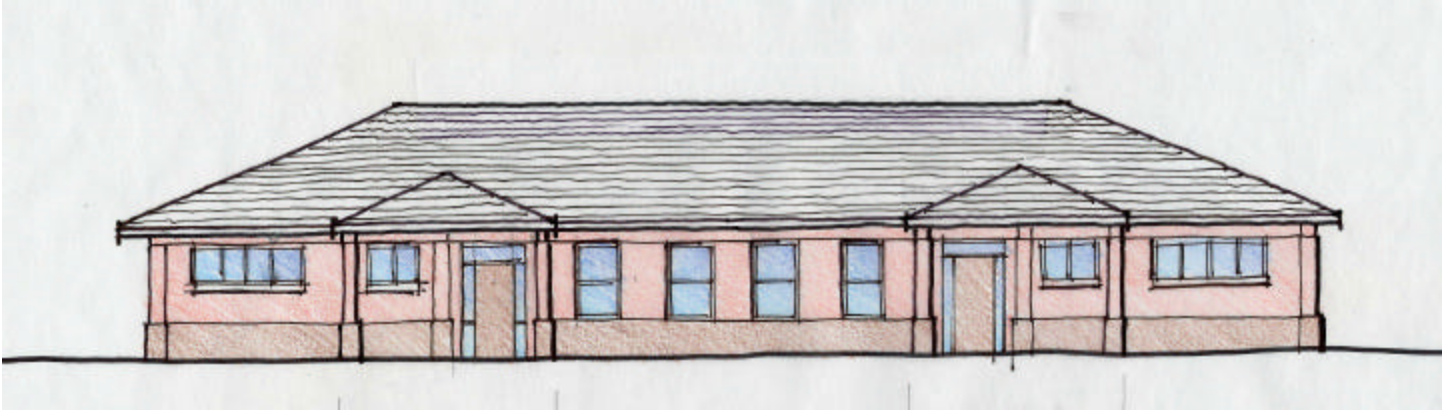


FIGURE 8: 2 BR Unit – Elevation “A”

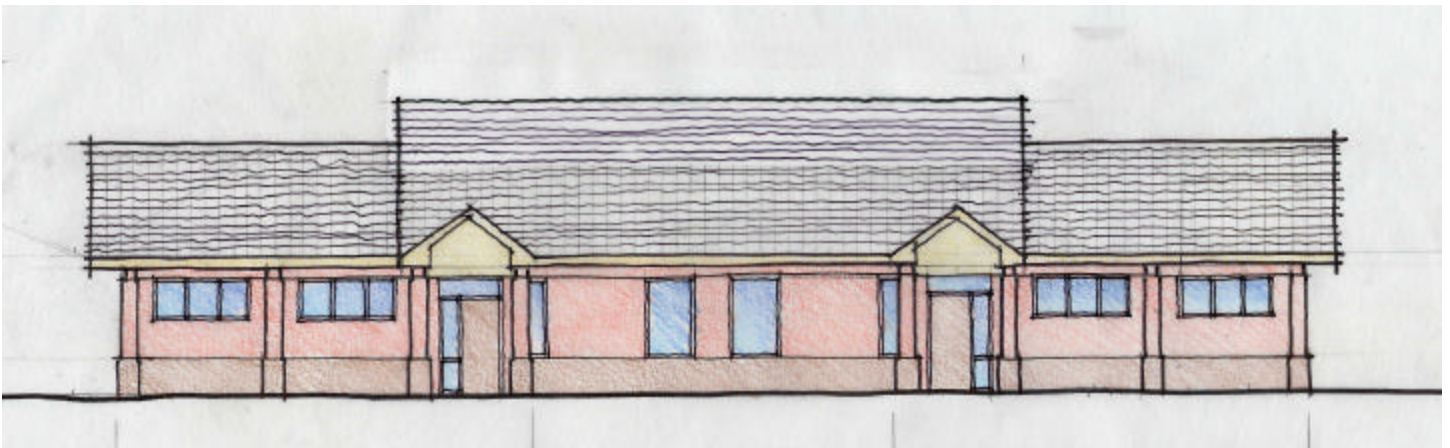


FIGURE 9: 2 BR Unit – Elevation “B”

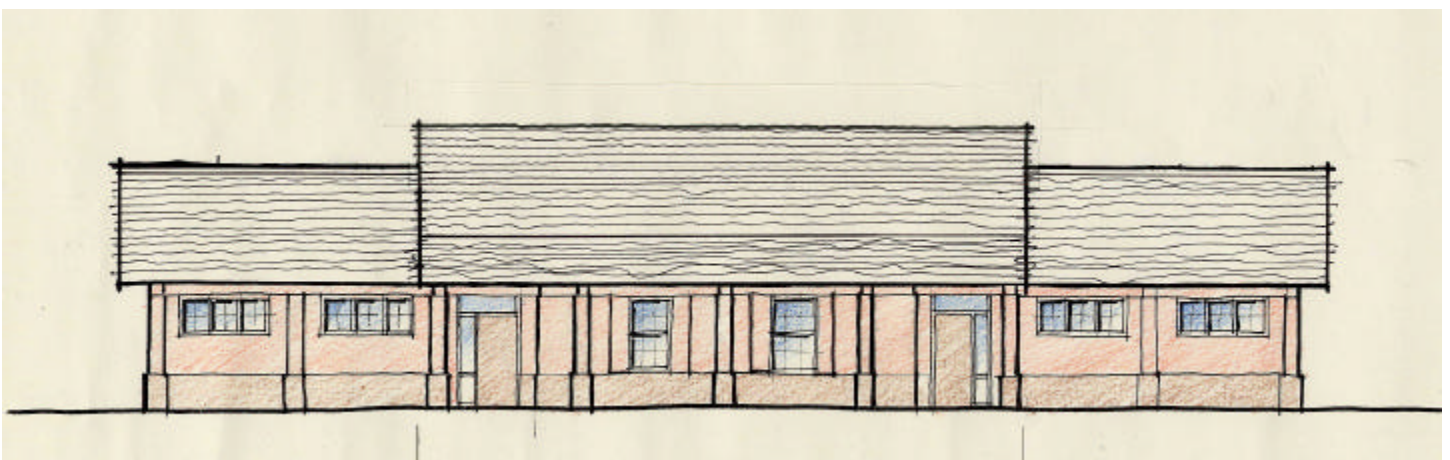


FIGURE 10: 2 BR Unit – Elevation “C”

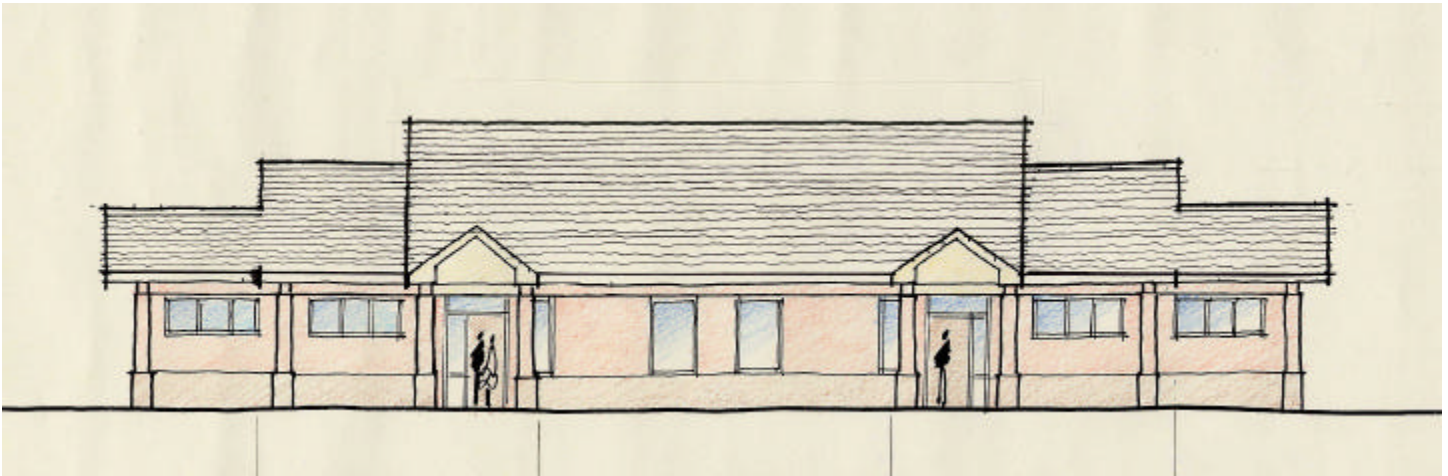


FIGURE 11: 2 BR Unit – Elevation “D”

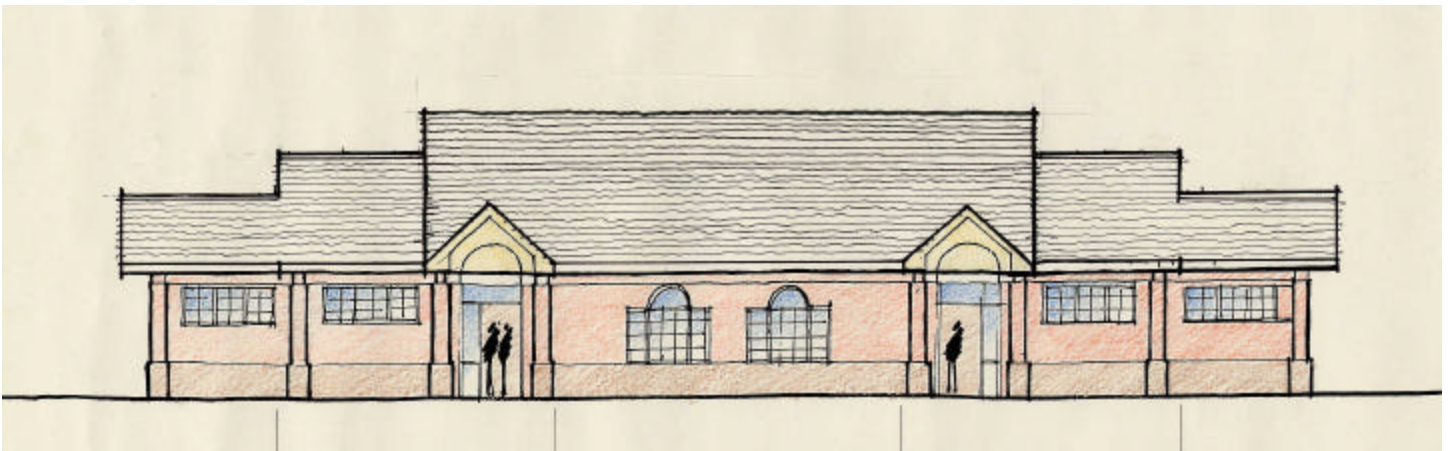


FIGURE 12: 2 BR Unit – Elevation “E”

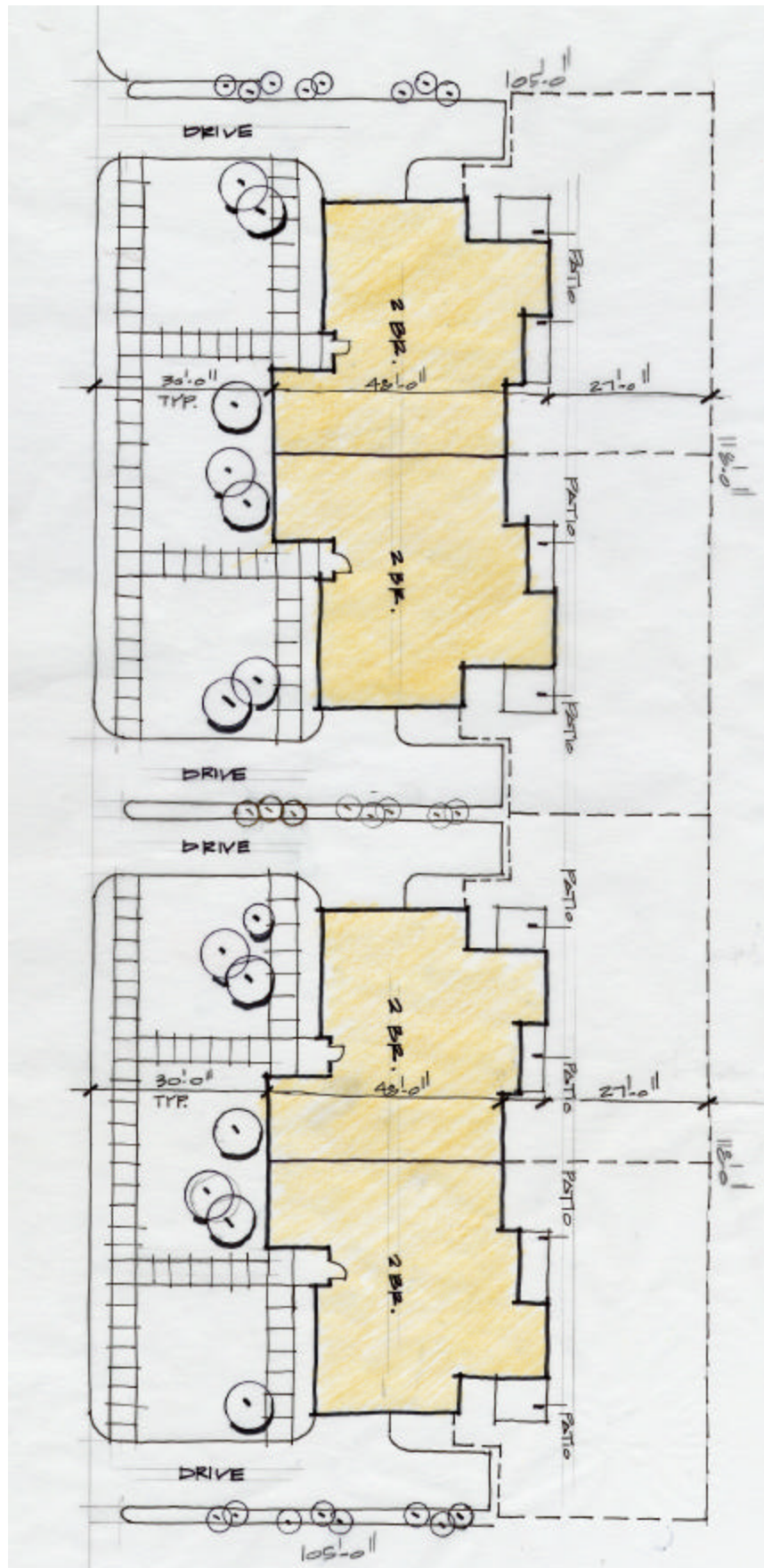


FIGURE 13: 2 BR Duplex Unit – Typical Site Plan

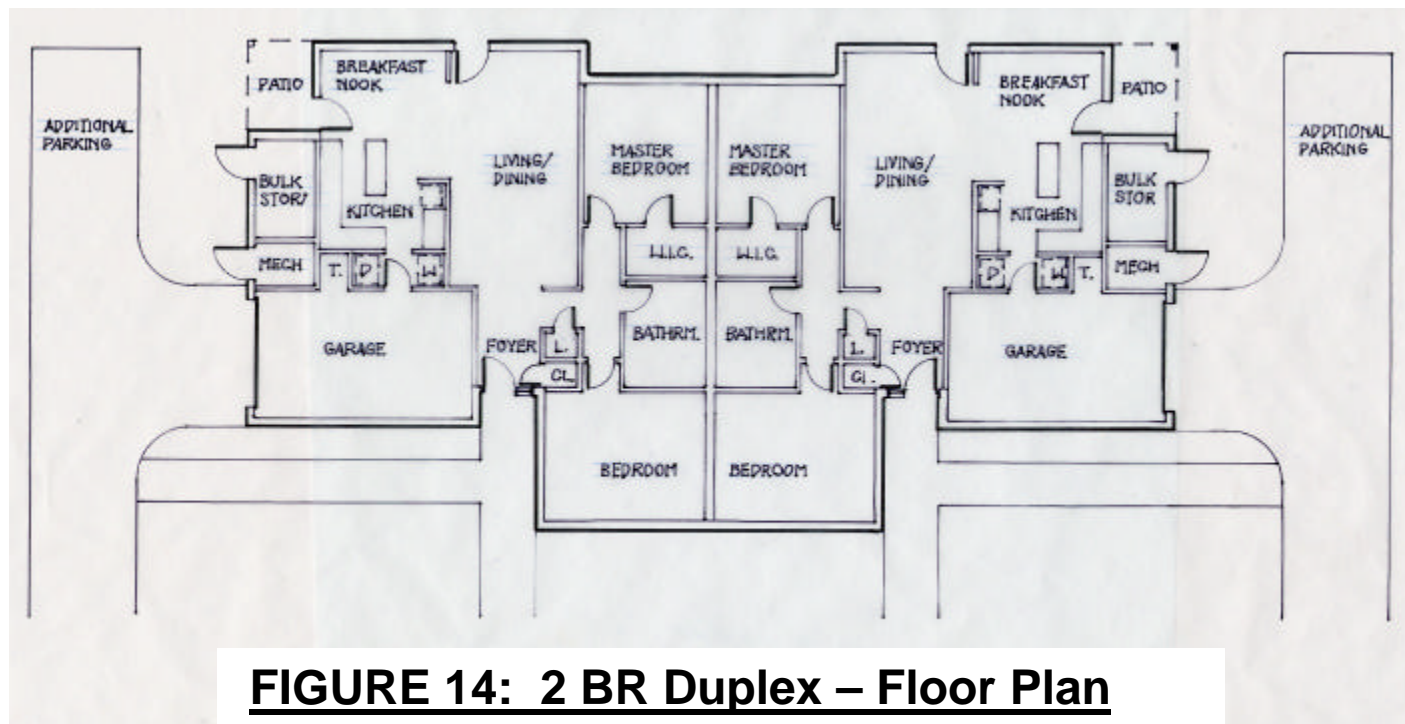


FIGURE 14: 2 BR Duplex – Floor Plan

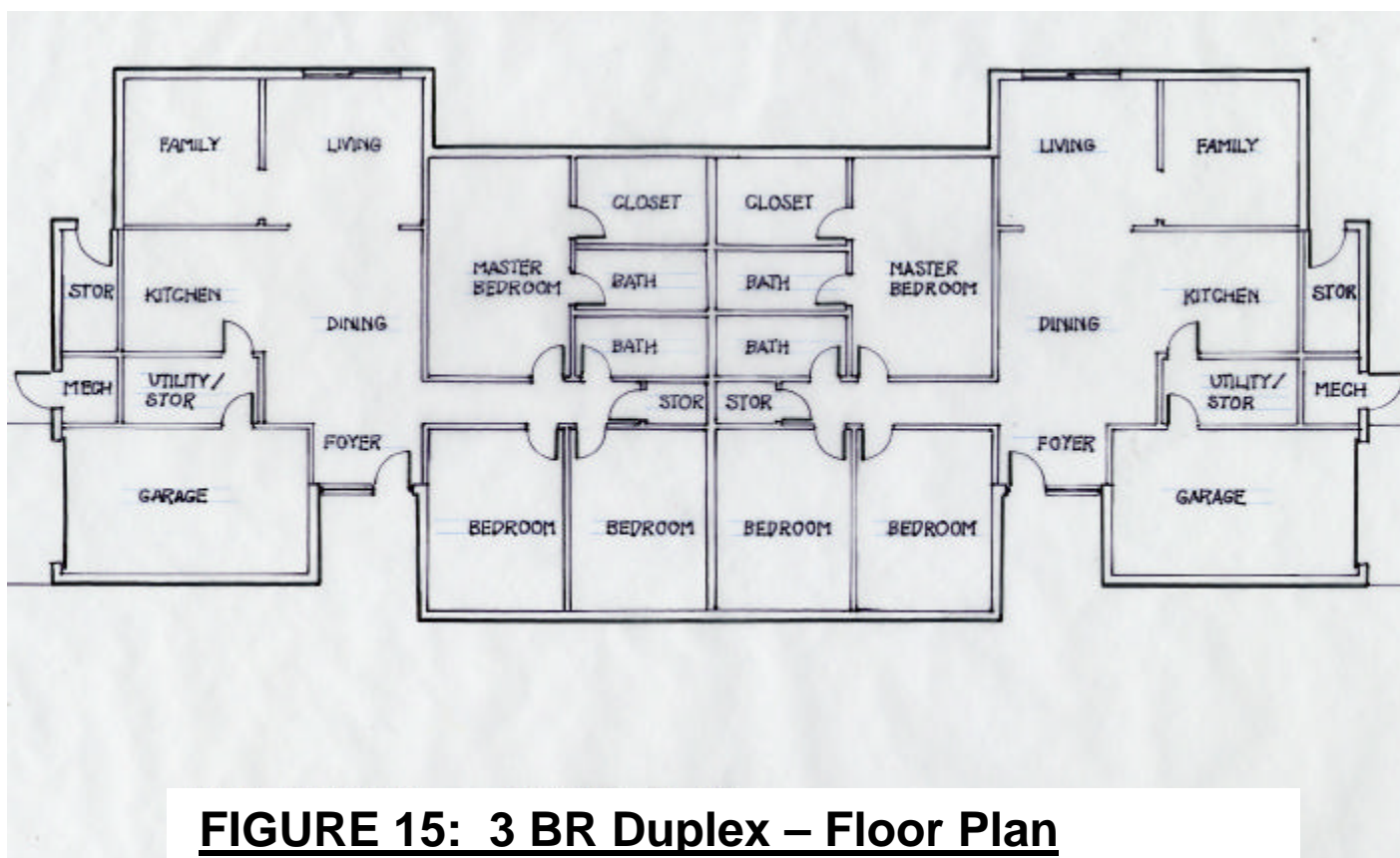


FIGURE 15: 3 BR Duplex – Floor Plan



} FY03
Housing Area

FIGURE 16: Proposed Master Housing Plan



FIGURE 17: Proposed Phase III Site Layout

DYESS AFB

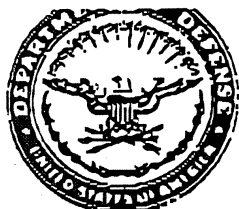
APPENDIX NO. 8

MEMORANDUM ON SEISMIC DESIGN CRITERIA FOR NEW CONSTRUCTION

Jan-28-02 09:30am From-HQ ACC/CEC

7577645339

T-960 P.02/06 F-194



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
LANGLEY AIR FORCE BASE, VIRGINIA

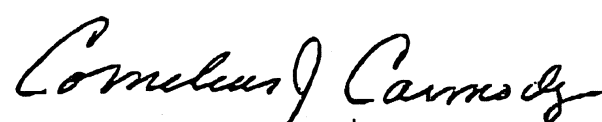
5 OCT 1998

MEMORANDUM FOR SEE DISTRIBUTION

FROM: HQ ACC/CEP
129 Andrews Street Suite 102
Langley AFB VA 23665-2769

SUBJECT: Seismic Design Criteria for New Construction/All Geographic Locations

1. The attached letter is for your information and continued action. Effective immediately, all new design starts for FY00 projects (all geographic locations) will incorporate new seismic design criteria. This criteria is applicable for all new buildings and new additions to existing buildings regardless of funding source.
2. For those who participated in the recently completed Air Force Seismic Survey and Evaluation, please note, there are no longer any areas where there is a zero seismic zone and that minimum values of building seismic response now apply to all geographic locations. The point of contact at HQ ACC/CEPC is Mr. Robert Tuck, DSN 574-6249 or e-mail robert.tuck@langley.af.mil. You may also contact HQ AFCESA/CES, Mr. Jim Lafrenz at DSN 523-6332 or e-mail, lafrenzi@afcesa.af.mil if you have any questions concerning seismic matters.


CORNELIUS J. CARMODY
Colonel, USAF
Chief, Programs Division

Attachments:

1. See Distribution List
2. HQ AFCESA/CES Ltr, 9 Sep 98

Global Power For America

Jan-28-02 09:31am From-HQ ACC/CEC

7577645339

T-960 P.03/06 F-194

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27 CES/CC Cannon AFB NM 88103
28 CES/CC Ellsworth AFB SD 57706
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Jan-28-02 09:31am

From-HQ ACC/CEC

7577645339

T-960 P.04/06 F-194



DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE CIVIL ENGINEER SUPPORT AGENCY

9 SEP 1998

MEMORANDUM FOR SEE DISTRIBUTION

FROM: HQ AFCEA/CES
139 Barnes Drive, Suite 1
Tyndall AFB FL 32403-5319

SUBJECT: Seismic Design Criteria for New Construction/All Geographic Locations

1. The 1997 Edition of the National Earthquake Hazard Reduction Program (NEHRP) *Provisions for New Buildings and Other Structures*, a national consensus standard, establishes new seismic design criteria. Effective immediately, apply this new criteria to all new design starts of Air Force projects in the FY00 construction programs. All design starts for new buildings and for new additions to existing buildings, regardless of funding source, must follow this criteria. This new criteria will not apply to designs beyond project definition approval stage as of this date. Only building code provisions that incorporate the 1997 NEHRP provisions will be considered as being equivalent design procedures. Existing buildings and alterations or renovations of existing buildings will continue to comply with HQ USAF/ILE memo, Mitigating Existing Building Seismic Deficiencies, 23 Apr 97 (Atch 2).
2. The new NEHRP provisions adopt the United States Geological Survey (USGS) national maps for seismic hazards. These new maps assign seismic load coefficients for all geographic areas for the United States, Guam, Tutuila, Puerto Rico, Culebra, Vieques, St. Thomas, St. John, and St. Croix. The traditional seismic maps associated with the Uniform Building Code (UBC) seismic design provisions are no longer valid. Minimum values of building seismic response apply to all geographic locations. There are no areas where there is a zero seismic zone. Site specific development procedures are available for foreign locations where USGS maps do not apply.
3. In addition to new maps, there are significant changes to the design procedures for incorporating seismic resistance into building systems. The design of structures will now be based on balanced energy dissipation and the prevention of structural collapse for a *maximum considered earthquake* (MCE). The only buildings exempt from the new design procedures are one- and two-family detached dwellings located in low seismic areas. HQ AFCEA/CESC is currently preparing a list for distribution of those Air Force bases and geographic locations where the exemption criteria will apply. There are also special design provisions for water treatment facilities, power generating stations, and petroleum storage and distribution systems.
4. The new design procedures recognize the differences between the rocky soil of the western United States and the deep deposits of soft soils of the eastern United States. This is the first time seismic provisions will be incorporated into all structures, including those in the low seismic

zones. Wind loads will no longer be assumed to govern in low and zero seismic areas. Designs must now incorporate seismic and wind provisions and the appropriate details for each design. Because this is the first time dynamic loading is a requirement, many designers will be required to accomplish something for which they have little or no experience. Therefore, some confusion and artificially inflated design costs will be experienced. We encourage those Air Force civil engineers that employ design agents to encourage those professionals to seek education courses through professional affiliations. A working knowledge of the 1997 NEHRP provisions will be a requirement to execute a successful design.

5. We do not expect significant increases in building costs because of the new design procedures and the detailing requirements. Detailing requirements are a normal practice for the high seismic areas of the western United States. The largest impact is expected to be a learning curve for those engineers in the low seismic areas to adopt standard seismic details to local practice. Experience suggests larger structural members or different materials are not necessary for seismic compliance. The 1997 NEHRP provisions focus more on connections than larger loads on primary frame members.

6. The 1997 NEHRP Provisions are adopted by reference in a new tri-services design procedures document. When published, Army Corps of Engineer document TI-809-04 (AFMAN 32-1149 V1 (I)), *Seismic Design for Buildings*, will supersede Army TM 5-809-10 (AFM 88-3, Chapter 13, Sep 1992). A DRAFT of the new publication is currently at Army Corps District Offices and Navy design centers. HQ AFCESA/CESC also has a copy available for any private sector firms doing a new design start for an Air Force facility. The final manuscript will be published in October 1998, with publication on electronic media by December 1998. The DRAFT document may be used and is suitable for new design starts.

7. The point of contact at HQ AFCESA/CES is Mr. Jim Lafrenz, DSN 523-6332, or e-mail lafrenzj@afcesa.af.mil.



LANCE C. BRENDEL, Colonel, USAF
Director of Technical Support

Attachments:

1. Distribution List
2. HQ USAF/ILE Memo, 23 Apr 97

Jan-28-02 09:32am From-HQ ACC/CEC

7577645339

T-960 P.06/06 F-194

DISTRIBUTION LIST

HQ USAF/LEC/LEP/LEO
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HQ AETC/CEC/CEO/CEP
266 F STREET WEST BLDG 901
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HQ AMC/CEC/CEO/CEP
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SCOTT AFB IL 62225-5022

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HICKAM AFB HI 96853-5412

HQ ACC/CEC/CEO/CEP
129 ANDREWS STREET SUITE 102
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APO AE 09094-5010

HQ AFSOC/CEC/CEP
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HQ AFRC/CEC/CEO/CEP
155 2ND STREET
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WASHINGTON DC 20374-5065

APPENDIX NO. 9

Sustainable Project Rating Tool (SPiRiT)

Version 1.4.1

**U. S. Army Corps of Engineers
U. S. Army Assistant Chief of Staff for Installation Management**

June 2002

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NOTES

- 1) This Sustainable Project Rating Tool (SPiRiT) is derived from The U. S. Green Building Council LEED 2.0 (Leadership in Energy and Environmental Design) Green Building Rating System™.
- 2) The SPiRiT numbering scheme parallels, but does not match LEED 2.0. LEED does not number major sections, which it calls 'Credit Categories,' ex. 'Sustainable Sites,' rather it numbers criteria or 'credits' within each major section. SPiRiT credit numbers match those of LEED where there is a 1:1 comparison. Where additional credits have been added they fall at the end of major sections.
- 3) The SPiRiT Credits all follow the format: Intent, Requirement and Technologies/Strategies.
 - Intent: A statement of the primary goal for the credit;
 - Requirement: Quantifiable conditions necessary to achieve stated intent;
 - Technologies/Strategies: Suggested technologies, strategies and referenced guidance on the means to achieve identified requirements.
- 4) Projects are evaluated for each SPiRiT credit which are either 'Prerequisites' or result in a point score:
 - Prerequisites: These credits are a statement of minimum requirements and must be met. No further points will be awarded unless the minimum is achieved. These credits are recognizable by an 'R' in the number scheme, ex. 1.R1, and a 'Reqd.' in the score column.
 - Point Score: These credits are evaluated and result in a point score. Where the potential score is greater than 1, no partial points are granted.
- 5) SPiRiT Sustainable Project Certification Levels:

SPiRiT Bronze	25 to 34 Points
SPiRiT Silver	35 to 49 Points
SPiRiT Gold	50 to 74 Points
SPiRiT Platinum	75 to 100 Points
- 6) SPiRiT credits have been developed to address facility life cycle phases including programming, design, construction, and commissioning. Additional rating tools will be developed to address installation/base master planning and facilities operations and maintenance, rehabilitation, recycling, and disposal.
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- 9) Army/USACE employees are members of the USGBC with membership privileges accessible via the USGBC web site, <http://www.usgbc.org>. For information on membership and access to available LEED resources to support use of SPiRiT and sustainable design in your projects, contact Richard Schneider at (217) 373-6752 or richard.l.schneider@erdc.usace.army.mil (Annette Stumpf at (217) 352-6511 ext. 7542 or annette.l.stumpf@erdc.usace.army.mil alternate).
- 10) For the latest information on SPiRiT and for access to guidance, tools and resources supporting sustainable design initiatives, visit the CERL 'Sustainable Design and Development Resource' website, <http://www.cecer.army.mil/SustDesign>. There you may also join the CERL Sustainable Design ListServ to be directly notified of information pertinent to sustainable design.

1.0	Sustainable Sites	Score	20
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1.R1	<u>Erosion, Sedimentation, and Water Quality Control</u> ⁽¹⁾	Reqd.
Intent:	Control erosion and pollutants to reduce negative impacts on water and air quality.	
Requirement:	<p>/// Design a site sediment and erosion control plan and a pollution prevention plan that conforms to best management practices in the EPA's Storm Water Management for Construction Activities, EPA Document No. EPA-833-R-92-001, Chapter 3, OR local Erosion and Sedimentation Control standards and codes, whichever is more stringent. The plan shall meet the following objectives:</p> <ul style="list-style-type: none"> /// Prevent loss of soil during construction by storm water runoff and/or wind erosion, including protecting topsoil by stockpiling for reuse. /// Prevent sedimentation of storm sewer or receiving streams and/or air pollution with dust and particulate matter. /// Prevent hazardous material discharge into storm water systems. /// Prevent petroleum oils and lubricants (POL) discharge into storm water systems. 	
Technologies /Strategies:	The EPA standard lists numerous measures such as silt fencing, sediment traps, oil grit separators, construction phasing, stabilization of steep slopes, maintaining vegetated ground cover and providing ground cover that will meet this prerequisite.	
1.C1	<u>Site Selection</u> ⁽¹⁾	
Intent:	Avoid development of inappropriate sites and reduce the environmental impact from the location of a building on a site. Select site based on functional adjacencies/relationships and land use compatibility.	
Requirement:	<p>/// Do not develop buildings on portions of sites that meet any one of the following criteria:</p> <ul style="list-style-type: none"> /// Prime training or maneuver land. /// Land whose elevation is lower than 5 ft. above the 100-year flood elevation as defined by FEMA. /// Land that provides habitat for any species on the Federal or State threatened or endangered list. /// Within 100 feet of any wetland as defined by 40 CFR, Parts 230-233 and Part 22, OR as defined by local or state rule or law, whichever is more stringent. 	1
	<p>/// Select site based on functional adjacencies/relationships and land use compatibility.</p> <ul style="list-style-type: none"> /// Select sites close to existing roads and utilities or use an existing structure to minimize the need for new infrastructure. /// Select site in area of high density. /// Site facilities based on the strength of their relationships to other facilities/land-uses to limit travel distances. The stronger the relationship/functional interaction, the closer the distance between two facilities. /// Select for distance to installation/base transit systems and access to pedestrian ways and bike paths. /// Select for development previously used or developed suitable and available sites. 	1
Technologies /Strategies:	Screen potential building sites for these criteria and/or ensure that these criteria are addressed by the designer during the conceptual design phase. Utilize landscape architects, ecologists, environmental engineers, civil engineers, and similar professionals for the screening process. New wetlands constructed as part of stormwater mitigation or other site restoration efforts are not affected by the restrictions of this prerequisite.	

⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

1.0 Sustainable Sites (Continued)

1.C2 Installation/Base Redevelopment ⁽¹⁾

Intent: Channel development to installation/base cantonment areas with existing infrastructure, protecting greenfields and preserving habitat and natural resources.

Requirement: ☒ ☒ Increase localized density to conform to existing or desired density goals by utilizing sites that are located within existing cantonment areas of high development density. **1**

☒ ☒ Select sites close to existing roads and utilities or use an existing structure to minimize the need for new infrastructure. **1**

Technologies /Strategies: During the site selection process give preference to previously developed sites with installation/base cantonment redevelopment potential such as facility reduction program cleared sites.

1.C3 Brownfield Redevelopment ⁽¹⁾

Intent: Rehabilitate damaged sites where development is complicated by real or perceived environmental contamination, reducing pressure on undeveloped land.

Requirement: ☒ ☒ Develop on a site classified as a brownfield and provide remediation as required by EPA's Brownfield Redevelopment program requirements OR Develop a brownfield site (a site that has been contaminated by previous uses). **1**

Technologies /Strategies: Screen potential damaged sites for these criteria prior to selection for rehabilitation.

Utilize EPA OSWER Directive 9610.17 and ASTM Standard Practice E1739 for site remediation where required.

1.C4 Alternative Transportation ⁽¹⁾

Intent: Reduce pollution and land development impacts from automobile use.

Requirement: ☒ ☒ Locate building within ½ mile of installation/base transit systems. **1**

☒ ☒ Provide suitable means for securing bicycles, with convenient changing/shower facilities for use by cyclists, for 5% or more of building occupants. **1**

☒ ☒ Locate building within 2 miles of alternative-fuel refueling station(s). **1**

☒ ☒ Size parking capacity not to exceed minimum installation/base cantonment requirements AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants, OR, add no new parking for rehabilitation projects AND provide preferred parking for carpools or van pools capable of serving 5% of the building occupants. **1**

Technologies /Strategies: Select sites near public installation/base transit served by safe, convenient pedestrian pathways.

⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

1.0 Sustainable Sites (Continued)

1.C5 Reduced Site Disturbance ⁽¹⁾

Intent: Conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity.

- Requirement: ~~✓~~ ~~✓~~ On greenfield sites, limit site disturbance including earthwork and clearing of vegetation to 40 feet beyond the building perimeter, 5 feet beyond primary roadway curbs, walkways, and main utility branch trenches, and 25 feet beyond pervious paving areas that require additional staging areas in order to limit compaction in the paved area; OR, on previously developed sites, restore a minimum of 50% of the remaining open area by planting native or adapted vegetation. **1**
- ~~✓~~ ~~✓~~ Reduce the development footprint (including building, access roads and parking) to exceed the installation/base's/master plan local zoning's open space requirement for the site by 25% or in accordance with installation/base policy on open space set asides, whichever is greater. **1**

Technologies /Strategies: Note requirements on plans and in specifications. Establish contractual penalties for destruction of trees and site areas noted for protection. Reduce footprints by tightening program needs and stacking floor plans. Establish clearly marked construction and disturbance boundaries. Delineate laydown, recycling, and disposal areas. Use areas to be paved as staging areas. Work with local horticultural extension services, native plant societies, or installation/base agronomy staff to select indigenous plant species for site restoration and landscaping.

1.C6 Stormwater Management ⁽¹⁾

Intent: Limit disruption of natural water flows by minimizing storm water runoff, increasing on-site infiltration and reducing contaminants.

- Requirement: Implement a stormwater management plan that results in:
- ~~✓~~ ~~✓~~ No net increase in the rate or quantity of stormwater runoff from undeveloped to developed conditions; OR, if existing imperviousness is greater than 50%, implement a stormwater management plan that results in a 25% decrease in the rate and quantity of stormwater runoff. **1**
- ~~✓~~ ~~✓~~ Treatment systems designed to remove 80% of the average annual post development total suspended solids (TSS), and 40% of the average annual post development total phosphorous (TP), by implementing Best Management Practices (BMPs) outlined in EPA's Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters (EPA-840-B-92-002 1/93). **1**

Technologies /Strategies: Significantly reduce impervious surfaces, maximize on-site stormwater infiltration, and retain pervious and vegetated areas. Capture rainwater from impervious areas of the building for groundwater recharge or reuse within building. Use green/vegetated roofs. Utilize biologically-based and innovative stormwater management features for pollutant load reduction such as constructed wetlands, stormwater filtering systems, bioswales, bio-retention basins, and vegetated filter strips. Use open vegetated swales to reduce drainage velocity and erosion, reduce system maintenance, increase vegetative variety and support wildlife habitat where space permits.

1.C7 Landscape and Exterior Design to Reduce Heat Islands ⁽²⁾

Intent: Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.

- Requirement: ~~✓~~ ~~✓~~ Provide shade (within 5 years) on at least 30% of non-roof impervious surface on the site, including parking lots, walkways, plazas, etc., OR, use light-colored/ high-albedo materials (reflectance of at least 0.3) for 30% of the site's non-roof impervious surfaces, OR place a minimum of 50% of parking space under-ground OR use open-grid pavement system (net impervious area of LESS than 50%) for a minimum of 50% of the parking lot area. **1**
- ~~✓~~ ~~✓~~ Use ENERGY STAR Roof compliant, high-reflectance AND low emissivity roofing (initial reflectance of at least .65 and three-year-aged reflectance of at least .5 when tested in accordance with ASTM E408) for a minimum of 75% of the roof surface; OR, install a "green" (vegetated) roof for at least 50% of the roof area. **1**

Technologies /Strategies: Employ design strategies, materials, and landscaping designs that reduce heat absorption of exterior materials. Note albedo/reflectance requirements in the drawings and specifications. Provide shade (calculated on June 21, noon solar time) using native or climate tolerant trees and large shrubs, vegetated trellises, or other exterior structures supporting vegetation. Substitute vegetated surfaces for hard surfaces. Explore elimination of blacktop and the use of new coatings and integral colorants for asphalt to achieve light colored surfaces.


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1.0 Sustainable Sites (Continued)

1.C8 Light Pollution Reduction ⁽¹⁾

Intent: Eliminate light trespass from the building site, improve night sky access, and reduce development impact on nocturnal environments.

Requirement:  Do not exceed Illuminating Engineering Society of North America (IESNA) footcandle level requirements as stated in the Recommended Practice Manual: Lighting for Exterior Environments, AND design interior and exterior lighting such that zero direct-beam illumination leaves the building site.

1


Technologies /Strategies: Consult IESNA Recommended Practice Manual: Lighting for Exterior Environments for Commission Internationale de l'Eclairage (CIE) zone and pre and post curfew hour descriptions and associated ambient lighting level requirements. Ambient lighting for pre-curfew hours for CIE zones range between .01 footcandles for areas with dark landscapes such as parks, rural, and residential areas, and 1.5 footcandles for areas with high ambient brightness such as installation/base areas with high levels of nighttime activity. Design site lighting and select lighting styles and technologies to have a minimal impact off-site and minimal contribution to sky glow. Minimize lighting of architectural and landscape features. Exterior lighting should be consistent with security lighting requirements.


1.C9 Optimize Site Features

Intent: Optimize utilization of the site's existing natural features and placement of man-made features on the site.

Requirement:  Perform both of the following:

1


 Maximize the use of free site energy.

 Plan facility, parking and roadways to "fit" existing site contours and limit cut and fill.


Technologies /Strategies: Evaluate site resources to ascertain how each can enhance the proposed project and visa versa. Work to maximum advantage of the site's solar and wind attributes. Use landscaping to optimize solar and wind conditions and to contribute to energy efficiency; Locate and orient the facility on the site to optimize solar and wind conditions.

1.C10 Facility Impact

Intent: Minimize negative impacts on the site and on neighboring properties and structures; avoid or mitigate excessive noise, shading on green spaces, additional traffic, obscuring significant views, etc.

Requirement:  Cluster facilities to reduce impact, access distance to utilities and sufficient occupant density to support mass transit.

1


 Collaborate with installation/base and community planners to identify and mitigate potential impacts of the project beyond site boundaries, and transportation planners to insure efficient public transport.

1

Technologies /Strategies: Involve local/regional planners and community members in installation/base master planning processes. Recognize the context and the impact of a project beyond site boundaries, and integrate it with the larger installation/base/community context/land use.

1.C11 Site Ecology

Intent: Identify and mitigate all existing site problems including contamination of soil, water, and air, as well as any negative impacts caused by noise, eyesores, or lack of vegetation, enhancing or creating new site habitat.

Requirement:  Develop site environmental management and mitigation plan.

1

Technologies /Strategies: Understand site and surrounding ecosystem interdependence and interconnectivity. Plan landscaping scheme to incorporate biodiversity. Preserve/enhance existing trees, hydrological features, ecosystems, habitats, and cultural resources. Increase the existence of healthy habitat for native species. Reintroduce native plants and trees where they have been destroyed by previous development.

⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

2.0	Water Efficiency	Score	5
-----	------------------	-------	---

2.C1 Water Efficient Landscaping ⁽²⁾

Intent: Limit or eliminate the use of potable water for landscape irrigation.

Requirement: ~~✓~~ ~~✓~~ Use high efficiency irrigation technology, OR, use captured rain or recycled site water to reduce potable water consumption for irrigation by 50% over conventional means. **1**

~~✓~~ ~~✓~~ Use only captured rain or recycled site water for an additional 50% reduction (100% total reduction) of potable water for site irrigation needs, OR, do not install permanent landscape irrigation systems. **1**

Technologies /Strategies: Develop a landscaping water use baseline according to the methodology outlined in the LEED Reference Guide. Specify water-efficient, native or adapted, climate tolerant plantings. High efficiency irrigation technologies include micro irrigation, moisture sensors, or weather data based controllers. Feed irrigation systems with captured rainwater, gray water, or on-site treated wastewater.

2.C2 Innovative Wastewater Technologies ⁽²⁾

Intent: Reduce generation of wastewater and potable water demand, while increasing local aquifer recharge.

Requirement: ~~✓~~ ~~✓~~ Reduce the use of municipally provided potable water for building sewage conveyance by a minimum of 50%, OR, treat 100% of wastewater on site to tertiary standards. **1**

Technologies /Strategies: Develop a wastewater baseline according to the methodology outlined in the LEED Reference Guide. Implement decentralized on-site wastewater treatment and reuse systems. Decrease the use of potable water for sewage conveyance by utilizing gray and/or black water systems. Non-potable reuse opportunities include, toilet flushing, landscape irrigation, etc. Provide advanced wastewater treatment after use by employing innovative, ecological, on-site technologies including constructed wetlands, a mechanical recirculating sand filter, or aerobic treatment systems.

2.C3 Water Use Reduction ⁽¹⁾

Intent: Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

Requirement: ~~✓~~ ~~✓~~ Employ strategies that in aggregate use 20% less water than the water use baseline calculated for the building (not including irrigation) after meeting Energy Policy Act (EPACT) of 1992 fixture performance requirements. **1**

~~✓~~ ~~✓~~ Exceed the potable water use reduction by an additional 10% (30% total efficiency increase). **1**

Technologies /Strategies: Develop a water use baseline including all water consuming fixtures, equipment, and seasonal conditions according to methodology guidance outlined in the LEED Reference Guide. Specify water conserving plumbing fixtures that exceed Energy Policy Act (EPACT) of 1992 fixture requirements in combination with ultra high efficiency or dry fixture and control technologies. Specify high water efficiency equipment (dishwashers, laundry, cooling towers, etc.). Use alternatives to potable water for sewage transport water. Use recycled or storm water for HVAC/process make up water. Install cooling tower systems designed to minimize water consumption from drift, evaporation and blowdown.

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3.0**Energy and Atmosphere****Score****28****3.R1 Fundamental Building Systems Commissioning ⁽¹⁾****Reqd.**

Intent: Verify and ensure that fundamental building elements and systems are designed, installed and calibrated to operate as intended.

Requirement: ~~✓~~ ~~✓~~ Implement all of the following fundamental best practice commissioning procedures.

- ~~✓~~ Engage a commissioning authority.
- ~~✓~~ Develop design intent and basis of design documentation.
- ~~✓~~ Include commissioning requirements in the construction documents.
- ~~✓~~ Develop and utilize a commissioning plan.
- ~~✓~~ Verify installation, functional performance, training and documentation.
- ~~✓~~ Complete a commissioning report.

Technologies /Strategies: Introduce standards and strategies into the design process early, and then carry through selected measures by clearly stating target requirements in the construction documents. Tie contractor final payments to documented system performance. Perform additional commissioning in accordance with the DOE Building Commissioning Guide, Version 2.2. Refer to the LEED Reference Guide for detailed descriptions of required elements and references to additional commissioning guides. Specify pre-occupancy baseline IAQ testing at time of commissioning. Test for indoor air concentrations of CO, CO₂, total VOCs and particulates. Test to assure that adequate ventilation rates have been achieved prior to initial occupancy.

3.R2 Minimum Energy Performance ⁽¹⁾**Reqd.**

Intent: Establish the minimum level of energy efficiency for the base building and systems.

Requirement: ~~✓~~ ~~✓~~ Design to meet building energy efficiency and performance as required by TI 800-01 (Design Criteria).

Technologies /Strategies: Use building modeling and analysis techniques to establish and document compliance. ASHRAE/IESNA 90.1-1999 provides guidance for establishing building base case development and analysis. Refer to the LEED Reference Guide for a wide variety of energy efficiency strategy resources.

Use a professionally recognized and proven computer program or programs that integrate architectural features with air-conditioning, heating, lighting, and other energy producing or consuming systems. These programs will be capable of simulating the features, systems, and thermal loads used in the design. Using established weather data files, the program will perform 8760 hourly calculations. BLAST, DOE-2 or EnergyPlus are acceptable programs for these purposes.

3.R3 CFC Reduction in HVAC&R Equipment ⁽²⁾**Reqd.**

Intent: Reduce ozone depletion.

Requirement: ~~✓~~ ~~✓~~ Zero use of CFC-based refrigerants in new base building HVAC&R systems. When reusing existing base building HVAC equipment, complete a comprehensive CFC phaseout conversion.

Technologies /Strategies: Specify only non-CFC-based refrigerants in all base building HVAC&R systems.


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3.0 Energy and Atmosphere (Continued)

3.C1 Optimize Energy Performance ⁽¹⁾

Intent: Achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use.

Requirement:  Reduce design energy usage (DEU) compared to the energy use budget (EUB) in joules per square meter per year for regulated energy components as described in the requirements of Chapter 11 of the TI 800-01 (Design Criteria), as demonstrated by a whole building simulation.

20

 1 Point will be awarded for every reduction in design energy use of 2.5% for both new and existing facilities for a maximum score of 20 points.

Regulated energy components include HVAC systems, building envelope, service hot water systems, lighting and other regulated systems as defined by ASHRAE.

Technologies /Strategies: Develop and use building modeling and analysis techniques to establish a base case that meets the minimum prerequisite standard. ASHRAE/IESNA 90.1-1999 provides guidance for establishing building base case development and analysis. Perform interactive energy use analysis for selected design elements that affect energy performance and document compliance.


Unit of measure for performance shall be annual energy usage in joules per square meter. Life-Cycle energy costs shall be determined using rates for purchased energy, such as electricity, gas, oil, propane, steam, and chilled water and approved by the adopting authority. Refer to the LEED Reference Guide or Whole Building Design Guide for a wide variety of energy efficiency resources and strategies including conservation measures, electromechanical energy efficiency technologies (for example ground-source heat pumps), passive heating and cooling strategies, solar hot water, and daylighting.

Life-Cycle costing will be done in accordance with 10 CFR 436.

Consider installation of an Energy Management and Control System (EMCS), which is compatible with exiting installation systems to optimize performance. Use sensors to control loads based on occupancy, schedule and/or the availability of natural resources use (day light or natural ventilation).

3.C2 Renewable Energy ⁽¹⁾

Intent: Encourage and recognize increasing levels of self-supply through renewable technologies to reduce environmental impacts associated with fossil fuel energy use.

Requirement:  Supply a net fraction of the building's total energy use through the use of on-site renewable energy systems.

% of Total Annual Energy Usage in Renewables

5%

1

10%

2

15%

3

20%

4

Technologies /Strategies: Employ the use of on-site non-polluting-source renewable technologies contributing to the total energy requirements of the project. Consider and use high temperature solar and/or geothermal, photovoltaics, wind, biomass (other than unsustainably harvested wood), and bio-gas. Passive solar, solar hot water heating, ground-source heat pumps, and daylighting do not qualify for points under this credit. Credit for these strategies is given in Energy & Atmosphere Credit 1: Optimizing Energy Performance.

⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

3.0 Energy and Atmosphere (Continued)

3.C3 Additional Commissioning ⁽²⁾

Intent: Verify and ensure that the entire building is designed, constructed, and calibrated to operate as intended.

Requirement: ~~NE~~ In addition to the Fundamental Building Commissioning prerequisite, implement the following additional commissioning tasks: 1

1. Conduct a focused review of the design prior to the construction documents phase.
2. Conduct a focused review of the construction documents when close to completion.
3. Conduct a selective review of contractor submittals of commissioned equipment.
4. Develop a system and energy management manual.
5. Have a contract in place for a near-warranty end or post occupancy review.

Items 1, 2, and 3 must be performed by someone other than the designer.

Technologies /Strategies: Introduce standards and strategies into the design process early, and then carry through selected measures by clearly stating target requirements in the construction documents. Tie contractor final payments to documented system performance. Refer to the LEED Reference Guide for detailed descriptions of required elements and references to additional guidelines.

3.C4 << Deleted >> ⁽¹⁾

3.C5 Measurement and Verification ⁽¹⁾

Intent: Provide for the ongoing accountability and optimization of building energy and water consumption performance over time.

Requirement: ~~NE~~ Comply with the installed equipment requirements for continuous metering as stated in selected Measurement and Verification Methods - Option B: Retrofit Isolation of the US DOE's International Performance Measurement and Verification Protocol (IPMVP) for the following: 1

- ~~NE~~ Lighting systems and controls.
- ~~NE~~ Constant and variable motor loads.
- ~~NE~~ Variable frequency drive (VFD) operation.
- ~~NE~~ Chiller efficiency at variable loads (kW/ton).
- ~~NE~~ Cooling load.
- ~~NE~~ Air and water economizer and heat recovery cycles.
- ~~NE~~ Air distribution static pressures and ventilation air volumes.
- ~~NE~~ Boiler efficiencies.
- ~~NE~~ Building specific process energy efficiency systems and equipment.
- ~~NE~~ Indoor water risers and outdoor irrigation systems.

Technologies /Strategies: Design and specify equipment to be installed in base building systems to allow for comparison, management, and optimization of actual vs. estimated energy and water performance. Employ building automation systems to perform M&V functions where applicable. Tie contractor final payments to documented M&V system performance and include in the commissioning report. Provide for ongoing M&V system maintenance and operating plan in building operations and maintenance manuals. Consider installation/base of an Energy Management and Control System (EMCS), which is compatible with exiting installation/base systems to optimize performance.

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⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

3.0 Energy and Atmosphere (Continued)

3.C6 Green Power ⁽¹⁾

Intent: Encourage the development and use of grid-source, renewable energy technologies on a net zero pollution basis.

Requirement: ~~✓~~ ~~✓~~ Engage in a two year contract to purchase the amount of power equal to projected building consumption generated from renewable sources that meet the Center for Resource Solutions (CRS) Green-E requirements. **1**

Technologies /Strategies: Purchase power from a provider that guarantees a fraction of its delivered electric power is from net nonpolluting renewable technologies. Begin by contacting local utility companies. If the project is in an open market state, investigate Green Power and Power Marketers licensed to provide power in that state. Grid power that qualifies for this credit originates from solar, wind, geothermal, biomass, or low-impact hydro sources. Low-impact hydro shall comply with the Low Impact Hydropower Certification Program.

3.C7 Distributed Generation

Intent: Encourage the development and use of distributed generation technologies, which are less polluting than grid-source energy.


Requirement: ~~✓~~ ~~✓~~ Reduce total energy usage and emissions by considering source energy implications and local cogeneration and direct energy conversion. Generate at least 50% of the building's projected annual consumption by on-site distributed generation sources. **1**

Technologies /Strategies: Investigate the use of integrated generation and delivery systems, such as co-generation, fuel cells, micro-turbines and off-peak thermal storage.

⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

4.R1 **Storage & Collection of Recyclables** ⁽¹⁾**Reqd.**

Intent: Facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills.


Requirement:  Provide an easily accessible area that serves the entire building that is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, glass, plastics, and metals.


Technologies /Strategies: Establish a waste management plan which meets requirements of the installation/base environmental and/or solid waste management plans in cooperation with users to encourage recycling. Reserve space for recycling functions early in the building occupancy programming process and show areas dedicated to collection of recycled materials on space utilization plans. Broader recycling support space considerations should allow for collection and storage of the required elements and newspaper, organic waste (food and soiled paper), and dry waste. When collection bins are used, bin(s) should be able to accommodate a 75% diversion rate and be easily accessible to custodial staff and recycling collection workers. Consider bin designs that allow for easy cleaning to avoid health issues.


4.C1 **Building Reuse** ⁽¹⁾

Intent: Extend the life cycle of existing building stock, conserve resources, retain cultural resources, reduce waste, and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.

Requirement: Reuse large portions of existing structures during renovation or redevelopment projects.

 Maintain at least 75% of existing building structure and shell (exterior skin and framing excluding window assemblies). **1**

 Maintain an additional 25% (100% total) of existing building structure and shell (exterior skin and framing excluding window assemblies). **1**

 Maintain 100% of existing building structure and shell AND 50% non-shell (walls, floor coverings, and ceiling systems). **1**


Technologies /Strategies: Evaluate retention of existing structure. Consider facade preservation, particularly in installation/base areas. During programming and space planning, consider adjusting needs and occupant use patterns to fit within existing building structure and interior partition configurations. Identify and effectively address energy, structural, and indoor environmental (lead & asbestos) issues in building reuse planning and deconstruction documents. Percentage of reused non-shell building portions will be calculated as the total area (s.f.) of reused walls, floor covering, and ceiling systems, divided by the existing total area (s.f.) of walls, floor covering, and ceiling systems.

4.C2 **Construction Waste Management** ⁽¹⁾

Intent: Divert construction, demolition, and land clearing debris from landfill disposal. Redirect recyclable material back to the manufacturing process.

Requirement: Develop and implement a waste management plan, quantifying material diversion by weight:

 Recycle and/or salvage at least 50% (by weight) of construction, demolition, and land clearing waste. **1**

 Recycle and/or salvage an additional 25% (75% total by weight) of the construction, demolition, and land clearing debris. **1**

Technologies /Strategies: Develop and specify a waste management plan which meets requirements of the installation/base environmental and/or solid waste management plans that identifies licensed haulers and processors of recyclables; identifies markets for salvaged materials; employs deconstruction, salvage, and recycling strategies and processes, includes waste auditing; and documents the cost for recycling, salvaging, and reusing materials. Source reduction on the job site should be an integral part of the plan.

The plan should address recycling of corrugated cardboard, metals, concrete brick, asphalt, land clearing debris (if applicable), beverage containers, clean dimensional wood, plastic, glass, gypsum board, and carpet; evaluate the cost-effectiveness of recycling rigid insulation, engineered wood products and other materials; hazardous materials storage and management; and participation in manufacturers' "take-back" programs to the maximum extent possible. Refer to the LEED Reference Guide for guidelines and references that provide waste management plan development and implementation support including model bid specifications.

⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

4.0 Materials and Resources (Continued)

4.C3 Resource Reuse ⁽²⁾

Intent:	Extend the life cycle of targeted building materials, reducing environmental impacts related to materials manufacturing and transport.	
Requirement:	✓ Specify salvaged or refurbished materials for 5% of building materials.	1
	✓ Specify salvaged or refurbished materials for 10% of building materials.	1
Technologies /Strategies:	Commonly salvaged building materials include wood flooring/ paneling/cabinets, doors and frames, mantels, iron work and decorative lighting fixtures, brick, masonry and heavy timbers. See the LEED Reference Guide for calculation tools and guidelines. Determine percentages in terms of dollar value using the following steps: <ol style="list-style-type: none"> 1. Calculate total dollars* (see exclusions) of the salvaged or refurbished material. 2. Calculate total dollars (see exclusions) of all building materials. 3. Divide Step 1 by Step 2 to determine the percentage. <p>Exclusions: In total dollar calculations, exclude; labor costs; all mechanical and electrical material and labor costs; and project overhead and fees. *If the cost of the salvaged or refurbished material is below market value, use replacement cost to estimate the material value, otherwise use actual cost to the project.</p>	

4.C4 Recycled Content ⁽¹⁾

Intent:	Increase demand for building products that have incorporated recycled content material, reducing the impacts resulting from extraction of new material.	
Requirement:	✓ Specify a minimum of 25% of building materials that contain in aggregate a minimum weighted average of 20% post-consumer recycled content material, OR, a minimum weighted average of 40% post-industrial recycled content material.	1
	✓ Specify an additional 25% (50% total) of building materials that contain in aggregate, a minimum weighted average of 20% post consumer recycled content material, OR, a minimum weighted average of 40% post-industrial recycled content material.	1
Technologies /Strategies:	Specify building materials containing recycled content for a fraction of total building materials. Select products and materials with supporting information from the AIA Resource Guide or the EPA Environmentally Preferable Purchasing (EPP) Program. Common building materials and products with recycled content include; wall, partition, and ceiling materials and systems; insulation; tiles and carpets; cement, concrete, and reinforcing metals; structural and framing steel. For products/materials not listed, selection should be made on the basis of EPP criterion and/or: <ul style="list-style-type: none"> ✓ Toxicity; ✓ Embodied energy; ✓ Production use of water, energy and ozone depleting substances (ODSs); ✓ Production limits on toxic emissions and effluents; ✓ Minimal, reusable or recycled/recyclable packaging; ✓ Impact on indoor environmental quality (IEQ); ✓ Installation that limits generation of waste; ✓ Materials that limit waste generation over their life; ✓ EPA guideline compliance; and ✓ Harvested on a sustainable yield basis. 	

See the LEED Reference Guide for a summary of the EPA guidelines and calculation methodology guidelines. Determine percentages in terms of dollar value using the following steps:

1. Calculate total dollars (see exclusions) of the material that contain recycled content.
2. Calculate total dollars (see exclusions) of all building materials.
3. Divide Step 1 by Step 2 to determine the percentage.

Exclusions: Labor costs; all mechanical and electrical material and labor costs; project overhead and fees)

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⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

4.0 Materials and Resources (Continued)

4.C5 Local/Regional Materials ⁽²⁾

Intent:	Increase demand for building products that are manufactured locally, reducing the environmental impacts resulting from transportation, and supporting the local economy.	
Requirement:	✓ ✓ Specify a minimum of 20% of building materials that are manufactured regionally within a radius of 500 miles.	1
	✓ ✓ Of these regionally manufactured materials, specify a minimum of 50% that are extracted, harvested, or recovered within 500 miles.	1
Technologies /Strategies:	<p>Specify and install regionally extracted, harvested, and manufactured building materials. Contact the state and local waste management boards for information about regional building materials. See the LEED Reference Guide for calculation methodology guidelines. Determine percentages in terms of dollar value using the following steps:</p> <ol style="list-style-type: none"> 1. Calculate total dollars (see exclusions) of material that is locally or regionally manufactured. 2. Calculate total dollars (see exclusions) of all building materials. 3. Divide Step 1 by Step 2 to determine the percentage. <p>Exclusions: Labor costs; all mechanical and electrical material and labor costs; project overhead and fees.</p>	

4.C6 Rapidly Renewable Materials ⁽²⁾

Intent:	Reduce the use and depletion of finite raw and long cycle renewable materials by replacing them with rapidly renewable materials.	
Requirement:	✓ ✓ Specify rapidly renewable building materials for 5% of total building materials.	1
Technologies /Strategies:	<p>Rapidly renewable resources are those materials that substantially replenish themselves faster than traditional extraction demand (e.g. planted and harvested in less than a 10 year cycle) and do not result in significant biodiversity loss, increase erosion, air quality impacts, and that are sustainably managed. See the LEED Reference Guide for calculation methodology guidelines. Determine percentages in terms of dollar value using the following steps:</p> <ol style="list-style-type: none"> 1. Calculate total dollars (see exclusions) of materials that are considered to be rapidly renewable. 2. Calculate total dollars (see exclusions) of all building materials. 3. Divide Step 1 by Step 2 to determine the percentage. <p>Exclusions: Labor costs; all mechanical and electrical material and labor costs; project overhead and fees.</p>	

4.C7 Certified Wood ⁽²⁾

Intent:	Encourage environmentally responsible forest management.	
Requirement:	✓ ✓ Use a minimum of 50% of wood-based materials certified in accordance with the Forest Stewardship Council guidelines for wood building components including but not limited to framing, flooring, finishes, furnishings, and non-rented temporary construction applications such as bracing, concrete form work and pedestrian barriers.	1
Technologies /Strategies:	Refer to the Forest Stewardship Council guidelines for wood building components that qualify for compliance to the requirements and incorporate into material selection for the project.	

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5.R1 Minimum IAQ Performance ⁽¹⁾**Reqd.**

Intent: Establish minimum IAQ performance to prevent the development of indoor air quality problems in buildings, maintaining the health and well being of the occupants.

Requirement: ~~✗~~ Meet the minimum requirements of voluntary consensus standard ASHRAE 62-1999, Ventilation for Acceptable Indoor Air Quality and approved Addenda.

Technologies /Strategies: Include proactive design details that will eliminate some of the common causes of indoor air quality problems in buildings. Introduce standards into the design process early. Incorporate references to targets in plans and specifications. Ensure ventilation system outdoor air capacity can meet standards in all modes of operation. Locate building outdoor air intakes (including operable windows) away from potential pollutants/contaminant sources such as sporulating plants (allergens), loading areas, building exhaust fans, cooling towers, sanitary vents, dumpsters, vehicular exhaust, and other sources. Include operational testing in the building commissioning report. Design cooling coil drain pans to ensure complete draining. Include measures to control and mitigate radon buildup in areas where it is prevalent. Limit humidity to a range that minimizes mold growth and promotes respiratory health.

5.R2 Environmental Tobacco Smoke (ETS) Control ⁽²⁾**Reqd.**

Intent: Prevent exposure of building occupants and systems to Environmental Tobacco Smoke (ETS).

Requirement: ~~✗~~ Zero exposure of nonsmokers to ETS by prohibition of smoking in the building, OR, by providing a designated smoking room designed to effectively contain, capture and remove ETS from the building. At a minimum, the smoking room shall be directly exhausted to the outdoors with no recirculation of ETS-containing air to the non-smoking area of the building, enclosed with impermeable structural deck-to-deck partitions and operated at a negative pressure compared with the surrounding spaces of at least 7 Pa (0.03 inches of water gauge). Performance of smoking rooms shall be verified using tracer gas testing methods as described in ASHRAE Standard 129-1997. Acceptable exposure in non-smoking areas is defined as less than 1% of the tracer gas concentration in the smoking room detectable in the adjoining non-smoking areas. Smoking room testing as described in the ASHRAE Standard 129-1997 is required in the contract documents and critical smoking facility systems testing results must be included in the building commissioning plan and report or as a separate document.

Technologies /Strategies: Prohibit smoking in the building and/or provide designated smoking areas outside the building in locations where ETS cannot reenter the building or ventilation system and away from high building occupant or pedestrian traffic.

5.C1 IAQ Monitoring ⁽¹⁾

Intent: Provide capacity for indoor air quality (IAQ) monitoring to sustain long term occupant health and comfort.

Requirement: ~~✗~~ Install a permanent carbon dioxide (CO₂) monitoring system that provides feedback on space ventilation performance in a form that affords operational adjustments, AND specify initial operational set point parameters that maintain indoor carbon dioxide levels no higher than outdoor levels by more than 530 parts per million at any time.

1

Technologies /Strategies: Install an independent system or make CO₂ monitoring a function of the building automation system. Situate monitoring locations in areas of the building with high occupant densities and at the ends of the longest runs of the distribution ductwork. Specify that system operation manuals require calibration of all of the sensors per manufacturer recommendations but not less than one year. Include sensor and system operational testing and initial set point adjustment in the commissioning plan and report. Also consider periodic monitoring of carbon monoxide (CO), total volatile organic compounds (TVOCs), and particulates (including PM₁₀).

⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

5.0 Indoor Environmental Quality (IEQ) (Continued)

5.C2 Increase Ventilation Effectiveness ⁽²⁾

Intent: Provide for the effective delivery and mixing of fresh air to building occupants to support their health, safety, and comfort.

Requirement: ~~✓~~ ~~✓~~ For mechanically ventilated buildings, design ventilation systems that result in an air change effectiveness (E) greater than or equal to 0.9 as determined by ASHRAE 129-1997. For naturally ventilated spaces demonstrate a distribution and laminar flow pattern that involves not less than 90% of the room or zone area in the direction of air flow for at least 95% of hours of occupancy. **1**

Technologies /Strategies: Employ architectural and HVAC design strategies to increase ventilation effectiveness and prevent short-circuiting of airflow delivery. Techniques available include use of displacement ventilation, low velocity, and laminar flow ventilation (under floor or near floor delivery) and natural ventilation. Operable windows with an architectural strategy for natural ventilation, cross ventilation, or stack effect can be appropriate options with study of inlet areas and locations. See the LEED Reference Guide for compliance methodology guidelines.

5.C3 Construction IAQ Management Plan ⁽²⁾

Intent: Prevent indoor air quality problems resulting from the construction/renovation process, to sustain long term installer and occupant health and comfort.

Requirement: Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows:

~~✓~~ ~~✓~~ During construction meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995, AND protect stored on-site or installed absorptive materials from moisture damage, AND replace all filtration media immediately prior to occupancy (Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE 52.2-1999). **1**

~~✓~~ ~~✓~~ Conduct a minimum two-week building flushout with new filtration media at 100% outside air after construction ends and prior to occupancy, OR, conduct a baseline indoor air quality testing procedure consistent with current EPA protocol for Environmental Requirements, Baseline IAQ and Materials, for the Research Triangle Park Campus, Section 01445. **1**

Technologies /Strategies: Specify containment control strategies including protecting the HVAC system, controlling pollutant sources, interrupting pathways for contamination, enforcing proper housekeeping and coordinating schedules to minimize disruption. Specify the construction sequencing to install absorptive materials after the prescribed dry or cure time of wet finishes to minimize adverse impacts on indoor air quality. Materials directly exposed to moisture through precipitation, plumbing leaks, or condensation from the HVAC system are susceptible to microbial contamination. Absorptive materials to protect and sequence installation include; insulation, carpeting, ceiling tiles, and gypsum products. Appoint an IEQ Manager with owner's authority to inspect IEQ problems and require mitigation as necessary.

5.C4 Low-Emitting Materials ⁽²⁾

Intent: Reduce the quantity of indoor air contaminants that are odorous or potentially irritating to provide installer and occupant health and comfort.

Requirement: Meet or exceed VOC limits for adhesives, sealants, paints, composite wood products, and carpet systems as follows:

~~✓~~ ~~✓~~ Adhesives must meet or exceed the VOC limits of South Coast Air Quality Management District Rule #1168 by, AND all sealants used as a filler must meet or exceed Bay Area Air Resources Board Reg. 8, Rule 51. **1**

~~✓~~ ~~✓~~ Paints and coatings must meet or exceed the VOC and chemical component limits of Green Seal requirements. **1**

~~✓~~ ~~✓~~ Carpet systems must meet or exceed the Carpet and Rug Institute Green Label Indoor Air Quality Test Program. **1**

~~✓~~ ~~✓~~ Composite wood or agrifiber products must contain no added urea-formaldehyde resins. **1**

Technologies /Strategies: Evaluate and preferentially specify materials that are low emitting, non-irritating, nontoxic and chemically inert. Request and evaluate emissions test data from manufacturers for comparative products. Ensure that VOC limits are clearly stated in specifications, in General Conditions, or in each section where adhesives, sealants, coatings, carpets, and composite woods are addressed.

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5.0 Indoor Environmental Quality (IEQ) (Continued)

5.C5 Indoor Chemical and Pollutant Source Control ⁽¹⁾

Intent: Avoid exposure of building occupants to potentially hazardous chemicals that adversely impact air quality.

Requirement: ~~✓~~ ~~✓~~ Design to minimize cross-contamination of regularly occupied areas by chemical pollutants: 1

~~✓~~ ~~✓~~ Employ permanent entryway systems (grills, grates, etc.) to capture dirt, particulates, etc. from entering the building at all high volume entryways, AND provide areas with structural deck to deck partitions with separate outside exhausting, no air recirculation and negative pressure where chemical use occurs (including housekeeping areas and copying/print rooms), AND provide drains plumbed for appropriate disposal of liquid waste in spaces where water and chemical concentrate mixing occurs.

Technologies /Strategies: Design to physically isolate activities associated with chemical contaminants from other locations in the building, providing dedicated systems to contain and remove chemical pollutants from source emitters at source locations. Applicable measures include eliminating or isolating high hazard areas; designing all housekeeping chemical storage and mixing areas (central storage facilities and janitors closets) to allow for secure product storage; designing copy/fax/printer/printing rooms with structural deck to deck partitions and dedicated exhaust ventilation systems; and including permanent architectural entryway system(s) to catch and hold particles to keep them from entering and contaminating the building interior.

Consider utilization of EPA registered anti-microbial treatments in carpet, textile or vinyl wall coverings, ceiling tiles or paints where microbial contamination is a concern. Utilize "breathable" wall finishes where circumstances require, to reduce moisture build-up and prevent microbial contamination. Minimize selection of fibrous materials, e.g. insulation, carpet and padding and flexible fabrics, whose exposed surfaces when exposed to the air stream or occupied space can contribute significant emissions and absorb and re-emit other contaminants over time.

5.C6 Controllability of Systems ⁽²⁾

Intent: Provide a high level of individual occupant control of thermal, ventilation, and lighting systems to support optimum health, productivity, and comfort conditions.

Requirement: ~~✓~~ ~~✓~~ Provide a minimum of one operable window and one lighting control zone per 200 s.f. for all occupied areas within 15 feet of the perimeter wall. 1

~~✓~~ ~~✓~~ Provide controls for each individual for airflow, temperature, and lighting for 50% of the non perimeter, regularly occupied areas. 1

Technologies /Strategies: Provide individual or integrated controls systems that control lighting, airflow, and temperature in individual rooms and/or work areas. Consider combinations of ambient and task lighting control and operable windows for perimeter and VAV systems for non perimeter with a 1:1: 2 terminal box to controller to occupant ratio.

5.C7 Thermal Comfort ⁽²⁾

Intent: Provide for a thermally comfortable environment that supports the productive and healthy performance of the building occupants.

Requirement: ~~✓~~ ~~✓~~ Comply with ASHRAE Standard 55-1992, Addenda 1995 for thermal comfort standards including humidity control within established ranges per climate zone. 1

~~✓~~ ~~✓~~ Install a permanent temperature and humidity monitoring system configured to provide operators control over thermal comfort performance and effectiveness of humidification and/or dehumidification systems in the building. 1

Technologies /Strategies: Integrated envelope and HVAC system design strategies that achieve thermal comfort conditions based on mean radiant temperature, local air velocity, relative humidity, and air temperature. Install and maintain a temperature and humidity monitoring system for key areas of the building (i.e., at the perimeter, and spaces provided with humidity control). This function can be satisfied by the building automation system. Specify in system operation manuals that all sensors require quarterly calibration. Include criteria verification and system operation in commissioning plan and report.

⁽¹⁾ Adapted material not reviewed or endorsed by U. S. Green Building Council.

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5.0 Indoor Environmental Quality (IEQ) (Continued)

5.C8 Daylight and Views ⁽²⁾

Intent: Provide a connection between indoor spaces and the outdoor environment through the introduction of sunlight and views into the occupied areas of the building.

Requirement: ~~✓~~ ~~✓~~ Achieve a minimum Daylight Factor of 2% (excluding all direct sunlight penetration) in 75% of all space occupied for critical visual tasks, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas. Exceptions include those spaces where tasks would be hindered by the use of daylight or where accomplishing the specific tasks within a space would be enhanced by the direct penetration of sunlight. **1**

~~✓~~ ~~✓~~ Direct line of sight to vision glazing from 90% of all regularly occupied spaces, not including copy rooms, storage areas, mechanical, laundry, and other low occupancy support areas. **1**

Technologies /Strategies: Implement design strategies to provide access to daylight and views to the outdoors in a glare-free way using exterior sun shading, interior light shelves, and /or window treatments. Orient buildings to maximize daylighting options. Consider shallow or narrow building footprints. Employ courtyards, atriums, clerestory windows, skylights, and light shelves to achieve daylight penetration (from other than direct effect or direct rays from the sun) deep into regularly occupied areas of the building.

5.C9 Acoustic Environment /Noise Control

Intent: Provide appropriate acoustic conditions for user privacy and comfort.

Requirement: ~~✓~~ ~~✓~~ Minimize environmental noise through appropriate use of insulation, sound-absorbing materials and noise source isolation. **1**

Technologies /Strategies: Evaluate each occupied environment and determine the appropriate layout, materials and furnishings design.

5.C10 Facility In-Use IAQ Management Plan

Intent: Insure the effective management of facility air quality during its life.

Requirement: ~~✓~~ ~~✓~~ Perform all of the following: **1**

~~✓~~ ~~✓~~ Develop an air quality action plan to include scheduled HVAC system cleaning.

~~✓~~ ~~✓~~ Develop an air quality action plan to include education of occupants and facility managers on indoor pollutants and their roles in preventing them.

~~✓~~ ~~✓~~ Develop an air quality action plan to include permanent monitoring of supply and return air, and ambient air at the fresh air intake, for carbon monoxide (CO), carbon dioxide (CO₂), total volatile organic compounds (TVOCs), and particulates (including PM₁₀).

Technologies /Strategies: Provide action plan for periodic system maintenance, monitoring, occupant/manager training.

⁽²⁾ ? U. S. Green Building Council. Used by permission.

6.C1 **Holistic Delivery of Facility**

Intent: Encourage a facility delivery process that actively engages all stakeholders in the design process to deliver a facility that meets all functional requirements while effectively optimizing tradeoffs among sustainability, first costs, life cycle costs and mission requirements.

- Requirement: ~~✓~~ ~~✓~~ Choose team leaders that are experienced in holistic delivery of facilities. 1
- ~~✓~~ ~~✓~~ Train the entire team in the holistic delivery process. The team must include all stakeholders in the facility delivery, including the users, the contracting staff, the construction representatives, project manager, and design/engineering team members. 1
- ~~✓~~ ~~✓~~ Identify project goals and metrics. 1
- ~~✓~~ ~~✓~~ Plan and execute charrettes with team members at critical phases of the facility delivery. 1
- ~~✓~~ ~~✓~~ Identify and resolve tradeoffs among sustainability, first costs, life cycle costs and mission requirements through charrettes and other collaborative processes. 2
- ~~✓~~ ~~✓~~ Document required results for each phase of project deliverables that achieve the project goals and are measurable throughout the facility life span. 1

Technologies /Strategies: Develop performance specifications or choose competitive range of products that meet environmental criteria.

 Use automated modeling and analysis tools to assess site and facility design alternatives.

 Conduct life-cycle cost analysis (LCCA) in the design process according to the Federal Facilities Council Technical Report, Sustainable Federal Facilities: A Guide To Integrating Value Engineering, Life Cycle Costing, and Sustainable Development, FFC # 142, 2000.

 Conduct a full ecological assessment to include soil quality, water resources and flows, vegetation and trees, wildlife habitats and corridors, wetlands, and ecologically sensitive areas to identify the least sensitive site areas for development. Evaluate space utilization/functions to reduce overall space requirements, considering networking, flextime, flexi-place, dual-use, and other strategies to reduce space requirements/optimize facility size.

7.0	Current Mission	Score	6
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7.C1 Operation and Maintenance

Intent: Encourage the development of a facility delivery process that enhances efficient operation and maintenance of the facility.

Requirement: ~~✓~~ ~~✓~~ Develop a facility operations and maintenance program to include: 2

- ~~✓~~ ~~✓~~ Commissioning instructions for all facility systems.
- ~~✓~~ ~~✓~~ Comprehensive facility operations and maintenance instructions for system operation, performance verification procedures and results, an equipment inventory, warrantee information, and recommended maintenance schedule. The instructions should include a comprehensive, preventive maintenance program to keep all facility systems functioning as designed.
- ~~✓~~ ~~✓~~ A periodic training program for occupants, facilities managers, and maintenance staff in all facility operations and maintenance activities.
- ~~✓~~ ~~✓~~ Instructions on sustainable cleaning and pest control practices.
- ~~✓~~ ~~✓~~ Develop a comprehensive site/facility recycling/waste management plan.

~~✓~~ ~~✓~~ Provide surfaces, furnishings, and equipment that are appropriately durable, according to life cycle cost analysis. 1

Technologies /Strategies: Maintain facility elements, systems and subsystems on a routine maintenance schedule to ensure integrity and longevity.

Perform scheduled cleaning and maintenance activities with nontoxic environmentally preferable cleaning products and procedures. Keep air ducts clean and free of microorganisms through a structured program of preventive maintenance. Clean lighting systems following a regular maintenance schedule to ensure optimum light output and energy efficiency.

Use pesticides and herbicides sparingly and only when necessary with preference to natural methods and materials over poisons and toxic agents.

Use automated monitors and controls for energy, water, waste, temperature, moisture, and ventilation monitors and controls. Turn off the lights, computers, computer monitors, and equipment when not in use. Enable power-down features on office equipment.

7.C2 Soldier and Workforce Productivity and Retention

Intent: Provide a high-quality, functional, healthy and safe work environment to promote soldier and workforce productivity and retention.

Requirement: ~~✓~~ ~~✓~~ Provide a high quality indoor environment to enhance user/occupant quality of life (QOL). 1

~~✓~~ ~~✓~~ Provide a highly functional work environment to promote user/occupant work productivity. 1

~~✓~~ ~~✓~~ Provide a healthy and safe work environment to sustain QOL and productivity. 1

Technologies /Strategies: Use a registered/certified interior designer to provide stimulating interior environments with pleasant colors, surface treatments, room proportions and ceiling heights, external views, natural lighting, and quality detailing for interior furnishings, equipment, materials and finishes. Use IES standards to provide light to occupied space with variations in level, comfortable contrasts, natural color rendition, natural/man-made, and adequate controls to optimize light aesthetic qualities. Provide occupant control of individual work areas configuration, and lighting, thermal and ventilation systems.

Collaborate with end users to identify functional and technical requirements and to perform adjacency studies. Configure occupied space to address the specific workers/occupants functions and activities that will be carried out there. Meet TI 800-01 Design Guide requirements. Design and configure occupied space, and select furniture and equipment using human ergonomics. Identify existing user amenities, such as dining, recreation, socialization, shopping and child care facilities. Identify what amenities should be incorporated into the project or provided in the future, nearby facility. Provide ventilation air in sufficient volume free from natural and man made contaminants.

8.C1 Functional Life of Facility and Supporting Systems

Intent: Assess the functional life of a facility and its supporting systems to optimize the infrastructure investment.

Requirement: ~~✗~~ ~~✗~~ Identify how long the designed function is likely to occupy the current facility. **1**

~~✗~~ ~~✗~~ Identify how long the envelope, structure, HVAC, plumbing, communications, electrical, and other systems are likely to last before requiring replacement or upgrade. Consider economic, functional and physical obsolescence. **1**

Technologies /Strategies: Assess the typical or likely lifespan of the function(s) to be accommodated to forecast eventual adaptation to a different use(s). Assess the life spans of the various building systems/components to forecast their revision/replacement during the facility lifespan and design in a manner that facilitates revision/replacement.

Consider the life span of the weapon systems, doctrines, or other programs supported by the facility.

Use life cycle data and other sources to identify the life span of the embodied systems.

8.C2 Adaptation, Renewal and Future Uses

Intent: Encourage facility design that is responsive to change over time to maximize accommodation of future uses without creating waste and insuring maximum useful life of products.

Requirement: ~~✗~~ ~~✗~~ Identify possible future uses for the facility; consider alternatives that expand the list of possible future uses. **1**
AND Design the building to accommodate as wide a range of future uses, as practical. AND Design the installation of building systems to accommodate foreseeable change with a minimum amount of disruption, cost, and additional materials.

~~✗~~ ~~✗~~ Build the smallest facility necessary to meet current mission functional requirements, using the most efficient shape and form, while taking into consideration expansion capabilities and potential future mission requirements. AND Design the facility for recycling of materials and systems. **1**

Technologies /Strategies: Create durable, long-lasting and adaptable facility shell and structural system. Create an adaptable, flexible facility design using open planning, service corridors, interstitial space, access floors, demountable walls/partitions, modular furniture and other adaptable space configuration/utilization strategies.

Select materials that are recyclable, avoiding composite materials, such as reinforced plastics and carpet fibers and backing. Consider selecting materials and labeling construction materials with identification information to facilitate recycling. Use pre-cut/pre-fabricated materials and use standard lengths and sizes (dimensional modularity) in design. Design facility systems and subsystems for reconfiguration and/or disassembly/recycling using reversible/reusable connectors.

Facility Points Summary

1.0	Sustainable Sites (S)	Score	0	Max 20
1.R1	✓ Erosion, Sedimentation and Water Quality Control			[Required]
1.C1	✓ Site Selection			2
1.C2	✓ Installation/Base Redevelopment			2
1.C3	✓ Brownfield Redevelopment			1
1.C4	✓ Alternative Transportation			4
1.C5	✓ Reduced Site Disturbance			2
1.C6	✓ Stormwater Management			2
1.C7	✓ Landscape and Exterior Design to Reduce Heat Islands			2
1.C8	✓ Light Pollution Reduction			1
1.C9	✓ Optimize Site Features			1
1.C10	✓ Facility Impact			2
1.C11	✓ Site Ecology			1
2.0	Water Efficiency (W)	Score	0	Max 5
2.C1	✓ Water Efficient Landscaping			2
2.C2	✓ Innovative Wastewater Technologies			1
2.C3	✓ Water Use Reduction			2
3.0	Energy and Atmosphere (E)	Score	0	Max 28
3.R1	✓ Fundamental Building Systems Commissioning			[Required]
3.R2	✓ Minimum Energy Performance			[Required]
3.R3	✓ CFC Reduction in HVAC&R Equipment			[Required]
3.C1	✓ Optimize Energy Performance			20
3.C2	✓ Renewable Energy			4
3.C3	✓ Additional Commissioning			1
3.C4	✓ <<Deleted>>			
3.C5	✓ Measurement and Verification			1
3.C6	✓ Green Power			1
3.C7	✓ Distributed Generation			1
4.0	Materials and Resources (M)	Score	0	Max 13
4.R1	✓ Storage & Collection of Recyclables			[Required]
4.C1	✓ Building Reuse			3
4.C2	✓ Construction Waste Management			2
4.C3	✓ Resource Reuse			2
4.C4	✓ Recycled Content			2
4.C5	✓ Local/Regional Materials			2
4.C6	✓ Rapidly Renewable Materials			1
4.C7	✓ Certified Wood			1
5.0	Indoor Environmental Quality (IEQ) [Q]	Score	0	Max 17
5.R1	✓ Minimum IAQ Performance			[Required]
5.R2	✓ Environmental Tobacco Smoke (ETS) Control			[Required]
5.C1	✓ IAQ Monitoring			1
5.C2	✓ Increase Ventilation Effectiveness			1
5.C3	✓ Construction IAQ Management Plan			2
5.C4	✓ Low-Emitting Materials			4
5.C5	✓ Indoor Chemical and Pollutant Source Control			1
5.C6	✓ Controllability of Systems			2
5.C7	✓ Thermal Comfort			2
5.C8	✓ Daylight and Views			2
5.C9	✓ Acoustic Environment /Noise Control			1
5.C10	✓ Facility In-Use IAQ Management Plan			1

Facility Points Summary (Continued)			Maximum Points
6.0	Facility Delivery Process (P)	Score	0
6.C1	✓ Holistic Delivery of Facility		7
7.0	Current Mission	Score	0
7.C1	✓ Operation and Maintenance		3
7.C2	✓ Soldier and Workforce Productivity and Retention		3
8.0	Future Missions	Score	0
8.C1	✓ Functional Life of Facility and Supporting Systems		2
8.C2	✓ Adaptation, Renewal and Future Uses		2
Total Score		0	Max 100

SPiRiT Sustainable Project Certification Levels	
SPiRiT Bronze	25 to 34 Points
SPiRiT Silver	35 to 49 Points
SPiRiT Gold	50 to 74 Points
SPiRiT Platinum	75 to 100 Points

Project Points of Contact

SPiRiT Comment Sheet

Please forward any comments that you may have on this Sustainable Project Rating Tool, preferably by Email, to:

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U. S. Army Corps of Engineers
ATTN: CEMP-ET
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Washington, DC 20314
Phone (202) 761-7170, FAX (202) 761-0633
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SPiRiT Para.This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

APPENDIX NO. 10

APPROVED XEROSCAPE LIST

Approved Xeroscape List

Shade Trees

Arizona Ash
Fan-Tex Ash
Cedar Elm
Red Oak
Eliditica Pine
Cottonwood

Specimen Trees*

*Spring blooming trees (white, pink, red)

Oklahoma Redbud
Forest Pansy Redbud
Eastern Redbud
Crabapple
Purple Robe Locust
Bradford Pear

Shrubs

Dwarf Burford Hollies
Nellie Stevens Hollies
Nandinas
Indian Hawthornes
Boxwoods – Japanese, Wintergreen, etc.
Roses
Vines of all Types
Honeysuckle
Yaupon Holly
Eounymas
Texas Sage
Silverado Sage
Junipers
Ground Covers – Liriope, Asian Jasmine, Periwinkle, etc.

APPENDIX NO. 11

FY03 HOUSING AREA DRAWINGS

See the Contract Viewer for Drawings

APPENDIX NO. 15

AIR FORCE FAMILY HOUSING GUIDE

The Air Force Family Housing Guide is provided on the Solicitation and Contract Award CD's in Microsoft Word format.